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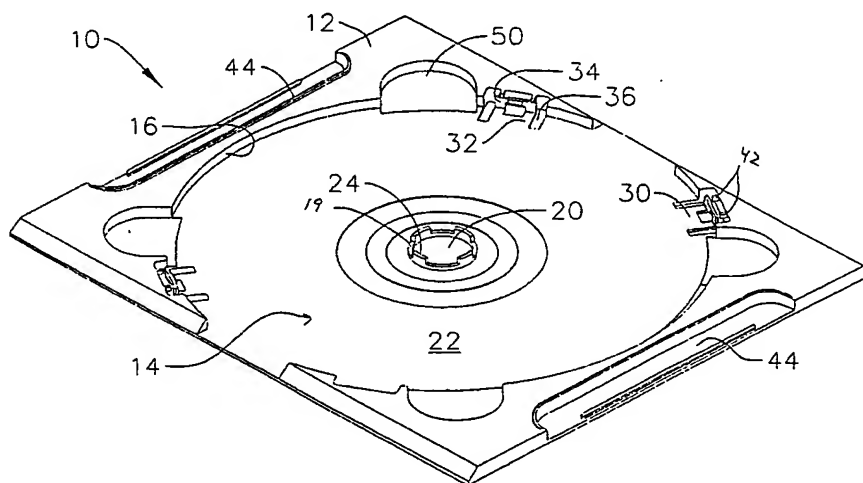
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(54) Title: DISC STORAGE CONTAINER



(57) Abstract: A storage container (10) has a support ring (19) that defines a disc storage area and a plurality of holding members (30) that securely retain a disc in the disc storage area, wherein each holding member has an arm (32) connected to the disc storage area and a disc supporting wall (34) having a lip (40) that limits the movement of the disc when the disc is placed in the disc storage area. The holding member is flexible so as to facilitate the insertion and removal of a disc from the disc storage area. In another embodiment, a storage container (100) includes a pair of release buttons (160, 161) placed diametrically opposed to one another to facilitate removal of a disc from the storage container. In yet another embodiment, a storage container (210) comprises a rectangular frame (272) that includes four ledges (276, 280, 284, 288) that create a recess with a frame for supporting a disc. Two latches (298, 400) securely retain the disc in the recess, wherein each latch has a lip that limits movement of the disc. Each latch is flexible so as to facilitate the insertion and removal of the disc.

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

1 DISC STORAGE CONTAINER

FIELD OF THE INVENTION

5 The present invention relates generally to disc storage containers and more particularly to a disc storage container which is configured to store an optical disc such as a CD, CD-ROM, CD-R, CD-RW, DVD, DVD-R, DVD-RAM or the like.

BACKGROUND OF THE INVENTION

10 Optical discs such as CDs, CD-ROMs, CD-Rs, CD-RWs, DVDs, DVD-Rs, DVD-RAMs and the like are well known. Such discs are commonly stored within a protective container. The protective container prevents the disc from being scratched or otherwise damaged during shipping, handling and storage thereof.

15 As those skilled in the art will appreciate, discs are subject to being damaged by mishandling thereof. Although the bottom surface of such discs comprises a layer of polycarbonate or the like which has a thickness of approximately 0.050 inch (and which is thus comparatively durable and resistant to physical damage), the top surface of such discs comprises an extremely delicate aluminum film which typically has a thickness of only approximately 1 micron.

20 The delicate aluminum surface on the top of contemporary discs is therefore undesirably susceptible to physical damage. Scratching or other damage to this thin aluminum film often results in damage to the data, e.g., computer program, computer data, audio data, video data or the like stored upon the disc. Although data is typically stored upon such optical discs in a manner which readily facilitates recovery of lost portions thereof due to such physical damage to the media, it is still possible to damage the aluminum film in a manner such that data is permanently lost. It is even possible to damage the disc sufficiently that it becomes completely unusable. Thus, protective storage containers are frequently utilized to facilitate shipping, handling and storage of such optical discs. The storage containers protect the discs from physical damage which might otherwise occur.

25 Although such contemporary storage containers for discs and the like have proven generally suitable for their intended use, contemporary storage containers suffer from inherent deficiencies which detract from their overall effectiveness and desirability. For example, contemporary storage containers are loaded with a disc, either initially at the factory or by a user, by pushing the disc downwardly into the container to force the central opening of the disc over a hub. Further, contemporary storage containers require that a disc be removed therefrom by pulling the disc upwardly at the periphery thereof, while pushing downwardly upon the hub of the storage container, so as to free the disc from the hub. Such pulling up at the periphery of the

1 disc causes the disc to deform or bend substantially, thereby introducing substantial stresses into the disc.

5 The introduction of such stresses is particularly undesirable for multi-layer optical discs, such as those used in the production of high density DVDs and the like. Multi-layer discs are rapidly becoming popular because of the ability to store large amounts of data, such as video programming thereon.

10 As those skilled in the art will appreciate, the introduction of such undesirable stresses into multi-layer discs may cause the plural layers of the disc to delaminate as the shear strength of the bonding agent used to attach adjacent layers to one another is exceeded. Such delamination will, of course, result in the destruction of the disc, rendering it completely useless.

15 Thus, it is desirable to provide a storage container which is configured to store an optical disc, such as a CD, CD-ROM, CD-R, CD-RW, DVD, DVD-R, DVD-RAM or the like, which mitigates the undesirable introduction of stresses into the optical disc when it is placed within the storage container (both during an initial machine placement of the disc within the storage container and during subsequent user placement of the optical disc therein) and when the disc is removed from the storage container.

20 It is further desirable that the storage container facilitate automated or machine based manufacturing techniques, wherein a machine arm, pusher or the like is used to place an optical disc within the storage container in a rapid and efficient manner. Such automated loading of a disc storage container should be performed without introducing substantial undesirable stresses to the disc. Further, it is desirable to provide a disc storage container which facilitates self-centering for both automated loading thereof and for loading thereof by a user, so as to further mitigate undesirable stresses being imparted to the disc and so as to make loading easier and more convenient.

25 Another disadvantage commonly associated with contemporary disc storage containers is that of their inability to adequately deter theft therefrom. It is well known that a disc may be removed from a contemporary disc storage container by merely slitting the outer cellophane wrapping thereof and then popping the disc loose from its retainer within the housing of the disc storage container so that the disc can be removed through the slit in the cellophane wrapper. Thieves generally prefer to remove such discs from their disc storage containers, since anti-theft devices are typically attached to the disc storage containers, and not the discs themselves.

30 For example, a small knife or other sharp object may be used to slit one end of the cellophane wrapper of a housing sufficiently to allow a disc to be removed therefrom. Then the housing is deformed or bent, such as by pressing in the middle thereof and pulling out the ends thereof, so as to disengage a disc contained therein from the hub. The loose disc may then be manipulated toward the opening which was slit in the cellophane wrapper, so as to facilitate

35

1 removal of the disc from the housing.

In view of the foregoing, it is further desirable to provide a housing which mitigates the ability of a thief to steal a disc by disengaging the disc from the housing, in the above-described manner.

5 SUMMARY OF THE INVENTION

A disc storage container for storing a disc having a center with a hole therein is provided. The disc storage container comprises a tray having a disc storage area formed therein, wherein the disc storage area has a floor and is circular in shape. The disc storage area is dimensioned to store the disc when the center of the disc is aligned with a center of the disc storage area. A supporting wall is provided which at least partially surrounds the disc storage area. A centering post positioned is provided which is positioned at the center of the floor of the disc storage area and is dimensioned to receive the hole of the disc when the disc is placed in the disc storage area. A plurality of holding members is configured to move outwardly in relation to the disc storage area, wherein each holding member has an arm attached to the floor of the disc storage area. A disc supporting wall extends laterally from the arm, wherein each holding member is disposed in an opening in the tray so as to contact the tray via the arm. A lip provided on the disc supporting wall for inhibiting upward movement of the disc when the disc is seated in the disc storage area. A plurality of recesses is provided wherein the recesses are dimensioned to allow access to the disc for removal of the disc from the disc storage area.

In another aspect of the present invention, a disc storage container is provided which comprises a housing having a cover, and a base. A hinge member is provided which interconnects the cover and the base via two living hinges. The cover has an open position and a closed position with respect to the base. A raised portion of the base defines a recess which is configured to receive at least one disc. At least one stop is formed upon the housing and is configured to inhibit removal of the disc from the recess when the cover is closed.

In yet another aspect of the present invention, a disc storage container comprises a frame having at least two ledges formed on the frame which define a recess configured to receive a disc. Additionally, a pair of latches are formed on the frame which are configured to bend out of the way when a disc is inserted into the frame from above.

30 BRIEF DESCRIPTION OF THE DRAWINGS

These and other features, aspects, and advantages of the present invention will be more fully understood when considered with respect to the following detailed description, appended claims, and accompanying drawings, wherein:

1 FIG. 1 is a plan view of an exemplary embodiment of the disc storage container of the present invention;

 FIG. 2 is a perspective view of the disc storage container of FIG. 1;

5 FIG. 3 is an enlarged fragmentary view of the holding member of the disc storage container of FIG. 1;

 FIG. 4 is a side cross-sectional view of the disc storage container of FIG. 1 taken along line 4-4, showing a disc in phantom above the disc storage container, the center of the disc being aligned with the center of the disc storage container;

10 FIG. 5 is the view of the storage container of FIG. 4 showing the disc installed in the storage container and securely held by the holding member;

 FIG. 6 is a plan view of another exemplary embodiment of the disc storage container of the present invention, shown in an open state;

 FIG. 7 is a perspective view of the disc storage container of FIG. 6;

15 FIG. 8 is an enlarged fragmentary view of the release buttons and holding members of an exemplary embodiment of the disc storage container of the present invention;

 FIG. 9 is an enlarged fragmentary view of the release button of an exemplary embodiment of the disc storage container of the present invention;

 FIG. 10 a side cross-sectional view of the disc storage container of FIG. 6 taken along line 10-10, showing a disc in phantom above the disc storage container;

20 FIG. 11 is the view of the storage container of FIG. 10 showing the disc installed in the storage container and securely held by the release buttons; and

 FIG. 12 is a side view of a release button of another exemplary embodiment of the present invention wherein the arm of the release button is attached to base of the disc storage container at an inclined angle.

25 FIG. 13 is a semi-schematic perspective view of another exemplary embodiment of the disc storage container of the present invention;

 FIG. 14 is a semi-schematic top view of the disc storage container of FIG. 13;

 FIG. 15 is a semi-schematic bottom view of the disc storage container of FIG. 13;

30 FIG. 16 is a semi-schematic cross-sectional view of the disc storage container of FIG. 14, taken along line 16 thereof;

 FIG. 17 is a semi-schematic end view of the disc storage container of FIG. 13, showing one end thereof, the other end thereof being substantially similar to the end shown;

 FIG. 18 is a semi-schematic cross-sectional view of the disc storage container of FIG. 14, taken along line 18 thereof;

35 FIG. 19 is a semi-schematic cross-sectional end view of the disc storage container of the present invention in the closed position thereof;

1 FIG. 20 is a semi-schematic side view of the disc storage container of FIG. 13;
 FIG. 21 is a semi-schematic cross-sectional view of the disc storage container of FIG. 14,
taken along line 21 thereof;
 FIG. 22 is a semi-schematic cross-sectional view of the disc storage container of FIG. 14,
5 taken along line 22 thereof;
 FIG. 23 is an enlarged semi-schematic perspective view of a latch of the disc storage
container of FIG. 13;
 FIG. 24 is a semi-schematic top view of a tray for a disc storage container, according to
the present invention; and
10 FIG. 25 is a semi-schematic top view of a further embodiment of the disc storage container
of the present invention;
 FIG. 26 is a semi-schematic cross sectional view of the disc storage container of FIG. 25,
taken along line 26 thereof; and
 FIG. 27 is a semi-schematic bottom view of the disc storage container of FIG. 25.

15 DETAILED DESCRIPTION OF THE INVENTION

 The detailed description set forth below in connection with the appended drawings is
intended as a description of exemplary embodiments of the invention and is not intended to
represent the only form in which the present invention may be constructed or utilized. The
20 detailed description sets forth the construction and functions of the invention, as well as the
sequence of steps for operating the invention in connection with the illustrated embodiments.
It is to be understood, however, that the same or equivalent functions may be accomplished by
different embodiments which are also intended to be encompassed within the spirit and scope of
the invention.

25 As used herein, the term disc is defined to include any compact disc (CD), compact disc
read only memory (CD-ROM), recordable compact disc (CD-R), rewriteable compact disc (CD-
RW), digital video disc or digital versatile disc (DVD), recordable digital video disc or digital
versatile disc (DVD-R), digital video disc random access memory or digital virtual disc random
access memory (DVD-RAM), as well as any other similar device which is used for storing
30 information.

 Referring now to FIGS. 1 through 5, according to a preferred embodiment of the present
invention, the disc storage container 10 comprises a tray 12, having a disc storage area 14 formed
therein. The disc storage container is preferably injection molded as an integrally formed unit,
preferably of a transparent or clear polymer material, such as polypropylene or polystyrene or the
35 like. The disc storage area 14 is preferably circular and is supported at its circumference, at least
in part, by a supporting wall 16. A centering post 18 is provided at the center 20 of the floor 22

1 of the disc storage area 14. The centering post 18 is dimensioned to fit inside the center hole of
an optical disc and to center the optical disc in the disc storage area 14 when the disc is placed
therein.

5 In a preferred embodiment, as shown in FIGS. 2 and 3, the centering post 18 comprises
a ring 19 and four equally radially spaced apart panels 24 extending upward from ring 19. The
panels 24 are positioned circumferentially so as to fit inside a center hole of a disc. In a preferred
embodiment, the center hole of the disc fits snugly on the centering post 18 of the disc storage
area 14. The panels 24 are spaced apart so as to allow easy access for the index finger of a user
10 to engage the center hole of a disc when the disc is installed on the centering post 18. The gap
between the panels 24 allows a user to contact the circumference of the center hole of a disc,
when the disc is installed on the centering post 18. When the index finger contacts the
circumference of the center hole of the disc, the index finger can be used to exert an upward force
on the disc, thus facilitating the removal of the disc from the disc storage area 14.

15 The disc storage area 14 is preferably formed as a depression in the tray 12, and the
diameter of the crater is dimensioned to receive an optical disc therein. The depth of the disc
storage area is equal to or greater than the thickness of the optical disc.

20 In a preferred embodiment of the present invention, the disc is secured in the disc storage
area 14 by a plurality of holding members 30. Each holding member 30 has an arm 32 and a disc
supporting wall 34 connected to the arm. The arm 32 is attached to the floor 22 of the disc
storage area 14 and preferably lies in the same plane as the floor 22. The disc supporting wall
34 preferably extends upward from the arm 32 at a substantially perpendicular angle. Each
holding member 30 is preferably located in an opening 36 in the tray 12 such that the only part
of the holding member 30 that is attached to the tray 12 is the arm 32.

25 The holding members 30 preferably include a lip 40 for retaining the disc in the disc
storage area 14. The lip 40 protrudes from the disc supporting wall 34 and inhibits the upward
movement of a disc that has been placed in the disc storage area 14. As shown in FIGS. 4 and
5, the lip 40 preferably has an inclined upper surface 41 to facilitate the insertion of the disc there
past.

30 In the embodiment shown in FIGS. 1 and 2, the disc storage container 10 includes four
holding members 30a, 30b, 30c, and 30d, respectively. The holding members 30a, 30b, 30c, and
30d are identical and referred to generally herein as 30. The holding members 30a-d are
preferably positioned in the tray 12 such that the first 30a and third 30c holding members are
diametrically opposed to each other and the second 30b and fourth 30d holding members are
diametrically opposed to each other.

35 The distance between the first 30a and the second 30b holding members is preferably
equal to the distance between the third 30c and the fourth 30d holding members. Similarly, the

1 distance between the second 30b and the third 30c holding members is preferably equal to the distance between the first 30a and the fourth 30d holding members. The positioning of the holding members and the distance therebetween is selected to maximize the stability for holding the disc in the disc storage area.

5 In a preferred embodiment, the four holding members are not equidistant from each other. Rather, the distance between the first 30a and second 30b holding members is preferably greater than the distance between the second 30b and the third 30c holding members. More preferably, the first and second holding members are 120 degrees apart, while the second and third holding members are separated by 60 degrees.

10 To insert a disc 1 into the disc storage area 14, the disc is positioned above the disc storage container 10, as shown in FIG. 4, such that the center of the disc is aligned with the centering post 18 of the disc storage container 10. As the disc 1 is urged downward, the periphery of the disc contacts the top surface of the lips 40 of the holding members 30a-d, causing the holding members 30 to extend or bend outwardly away from the center 20 of the disc storage area 14.
15 As the disc is being moved downwardly toward the floor 22, its periphery moves past the lips 40 whereupon the holding members 30 snap or bend back to their original positions so as to capture the disc 1, at the unrecorded periphery thereof, as best shown in FIG. 5. The design of the holding members 30, namely, the inclined upper surface 41, is structured to ensure that the holding members 30 bend outwards as the disc is installed in the disc storage container 10.
20 Unlike prior art devices, the holding members 30 of the present invention will not bend inward and will not interfere with the installation of the disc into the disc storage area.

As shown in FIG. 3, the arm 32 of the holding member 30 is constructed such that it is sufficiently flexible and pliant so as to allow the holding member 30 to bend outward when the disc is being installed in the disc storage area. Yet, the arm is sufficiently rigid to inhibit the movement of disc 1 once it is installed in the disc storage area. In one embodiment of the invention, arm 32 has a cut-out relief 38 therein to ensure flexibility of the holding member 30.
25

Referring to FIGS. 1 and 3, in a preferred embodiment of practice of the present invention, support tabs 42 are provided on the tray 12 projecting from the tray into the opening 36 toward the holding member 30. The support tabs 42 are positioned so as to limit the distance that the holding members 30 can bend outwardly. The limiting action of the tabs prevents the holding members 30 from moving or bending excessively outward to avoid mechanical failure of the arm 32. The support tabs 42 are preferably provided in each opening 36 to support each holding member 30.
30

As shown in FIGS. 1 and 2, in a preferred embodiment, the tray 12 includes recesses 50a, 50b, 50c and 50d to facilitate the removal of the disc 1 from the disc storage area 14. The recesses are identical and are generally referred to herein as 50. The recesses 50a-d are
35

1 dimensioned to allow a portion of a finger, e.g., the tip, to reach under the disc 1, thereby
allowing the disc to be grasped and popped out of the tray 12. Alternatively, a machine operated
tool can be inserted into the recess 50 to facilitate the removal of the disc 1 from the disc storage
area 14. In the preferred embodiment, the shape of the recess is semi-circular.

5 Each recess 50 is preferably positioned adjacent an opening 36 containing a holding
member 30 therein. The placement of the recess 50 in proximity to a holding member 30
facilitates the removal of the disc 1 from the disc storage area 14 by allowing the user to
counteract the holding force exerted by the holding member 30. In the preferred embodiment,
the first recess 50a is positioned diametrically opposed to the third recess 50c and the second
10 recess 50d is positioned diametrically opposed to the fourth recess 50d. The recesses 50 are
positioned near the holding members 30 so as to efficiently utilize the lifting force applied to the
disc to counteract the holding force applied by the holding members 30.

Referring to FIGS. 1 and 2, the distance between the first 50a and the second 50b recesses
is preferably equal to the distance between the third 50c and the fourth 50d recesses. Similarly,
15 the distance between the second 50b and the third 50c recesses is preferably equal to the distance
between the first 50a and the fourth 50d recesses. In a preferred embodiment, the four recesses
are not equidistant from each other. Rather, the distance between the first 50a and second 50b
recesses is preferably greater than the distance between the second 50b and the third 50c recesses.

The tray 12 of the disc storage container 10 is configured to be stackable with other trays.
20 Accordingly, multiple disc storage containers can be stacked on top of each other to minimize
the space needed for storing the containers. To facilitate the selection of one tray 12 from a stack
of trays, each tray has a groove 44 on the side of the tray that is accessible when the tray is
stacked with other trays.

Referring now to FIGS. 6 through 11, an alternative embodiment of a disc storage
25 container 100 is provided in accordance with the present invention is shown. The storage
container 100 comprises a cover or upper housing section 102 and a lower housing section 104.
The upper housing section 102 is preferably attached to the lower housing section 104 via a hinge
panel 106 which is attached to the upper housing section 102 via a first living hinge 108 and
which is attached to the lower housing section 104 via second living hinge 110. Hinge panel 106
30 preferably includes a reinforcing rib 112 to enhance the structural strength thereof. The storage
container 100 is preferably made of a polymer material which can provide a living hinge, such
as polypropylene. Those skilled in the art will appreciate that various other means for attaching
the upper housing section 102 to the lower housing section 104 are likewise suitable. For
example, pivot hinges, such as those typically found in contemporary compact disc storage
35 containers, are likewise suitable for attaching the upper housing section 102 to the lower housing
section 104.

1 First and second clips 114a and 114b, respectively, facilitate removable attachment of a
cover, pamphlet, brochure, booklet or the like to the upper housing section 102. In one
embodiment of the invention, the upper housing section 102 comprises a transparent window 116
such that either the cover or a front page of the pamphlet, brochure, booklet or the like may be
5 viewed when the disc storage container is closed. When the cover is closed, the first 108 and
second 110 living hinges are bent such that the upper housing section 102 is laminarily juxtaposed
to and generally parallel with the lower housing section 104.

As best shown in FIG. 6 and 7, the upper housing section 102 and lower housing section
103 comprise an upper and lower housing flange 118 and 120. The upper housing flange 118 and
10 lower housing flange 120 cooperate when the disc storage container is closed to define side walls
therefor. In one embodiment, the upper housing section 102 has an upper concave edge 134 that
corresponds to a lower concave edge 136 on the lower housing section 104. When the disc
storage container is in a closed configuration, the upper and lower concave edges 134, 136 form
an indentation on the exterior of the case. The upper and lower concave edges facilitate the
15 opening of the disc storage container by providing an indentation in the disc storage container
100 that can be manipulated by a user's fingers to open the container.

The disc storage container is preferably injection molded as an integrally formed unit,
preferably of a substantially transparent or clear polymer material, such as polypropylene.
Alternatively, the upper housing section may be formed separately from the lower housing
20 section and then attached thereto during assembly via attachment means such as pivot hinges.

Upper housing latches 122a and 122b cooperate with lower housing latches 124a and
124b, respectively, to openably latch the disc storage container 100 in a closed configuration.
Upper housing latches 122a and 122b preferably define detents which engage complimentary
detents defined by lower housing latches 124a and 124b according to well-known principles.

25 Referring to FIGS. 8 and 9, in addition to FIGS. 6 and 7, the lower housing section
comprises a disc storage area 126 which is surrounded and defined by a support ring 128. The
support ring 128 preferably comprises a projecting portion (best seen in FIGS. 8 and 9), the upper
surface of which is flattened so as to define a seat 130 for a disc. The seat 130 is configured so
as to contact the disc about the unrecorded periphery thereof only.

30 The support ring 128 preferably comprises four partial quadrants 128a, 128b, 128c and
128d, each partial quadrant physically separated from the other partial quadrants by a hole 132
in the disc storage container 100. The quadrants 128a-d collectively define the disc storage area
126.

35 In a preferred embodiment of a container in accordance with the present invention, a disc
is secured in the disc storage area 126 by a pair of holding members 140, 141 and a pair of release
buttons 160, 161. Each holding member 140, 141 is disposed in a respective hole or opening 132

1 and more preferably, the pair of holding members 140, 141 are disposed in respective holes or
openings 132 diametrically opposed to each other. In a preferred embodiment, as best shown in
FIG. 8, each holding member 140, 141 comprises a pair of radially extending, spaced apart arms
142 and a disc supporting wall 144. The holding member is attached to the floor 127 of the disc
5 storage area 126 by the pair of extending arms 142. The disc supporting wall 144 extends
laterally from the pair of extending arms and is structurally supported thereby.

The disc supporting wall 144 comprises a retaining lip 146. The retaining lip 146 is
dimensioned to maintain a disc in the disc storage area 126 by limiting the upward movement of
the disc disposed upon the seat 130. In the preferred embodiment, the retaining lip 146 is a flat
10 ledge that is perpendicularly connected to the disc supporting wall 144. The composition and
dimensions of the extending arms 142 are selected so as to provide a flexible, pliant holding
member 140 that bends in order to facilitate the insertion and removal of a disc from the disc
storage area 126. Yet the holding member 140, 141 must remain sufficiently rigid to retain a disc
in the disc storage area 126 when the disc is stored therein.

15 In a preferred embodiment of the invention, the disc is also retained in the disc storage
area 126 by a pair of release buttons 160, 161. Each release button 160, 161 is disposed in a
respective hole 132 and more preferably, the pair of release buttons 160, 161 are disposed in
respective holes 132 diametrically opposed to each other. In the preferred embodiment, as best
shown in FIGS. 8 and 9, each release button 160, 161 comprises a base 162 and a disc supporting
20 wall 164. The base 162 of the release button is preferably attached to the floor 127 of the disc
storage area 126. The disc supporting wall 164 extends laterally from the base 162 and is
structurally supported thereby.

Turning particularly to FIGS. 6 and 7, in a preferred embodiment, the reinforcing rib 112
has a raised portion 148 thereon. One of the holding members 140 is positioned such that when
25 the disc storage container 100 is in a closed configuration, the raised portion 148 bears against
the back surface of the disc supporting wall 144 of the associated holding member 140. The
raised portion 148 exerts force on the holding member 140 to keep the disc supporting wall 144
pressed toward the center of the disc storage area 126, thus securely retaining a disc placed in the
disc storage area. Similarly, the upper concave edge 134 of the upper housing section 102
30 includes a projecting portion 150 thereon. A second holding member 141 is positioned such that
when the disc storage container 100 is in a closed configuration, the raised portion 150 of the
upper concave edge 134, bears against the disc supporting wall 144 of the holding member 141.
When both holding members 140, 141 are pressed toward the center of the disc storage area 126,
a disc placed between the holding members 140, 141 is securely held in place. Accordingly, the
35 raised portions 148 and 150 work together to hold the opposed holding members closed, in order
to secure the disc between the holding members. This feature, together with the release buttons

1 160, 161, is particularly helpful in keeping the disc between the holding members in the event that the storage container is accidentally dropped.

Referring to FIG. 9, the disc supporting wall 164 comprises a retaining lip 166. The retaining lip 166 is dimensioned to maintain a disc in the disc storage area 126 by limiting the upward movement of the disc disposed upon the seat 130. In the preferred embodiment, the retaining lip 166 is a flat ledge that is perpendicularly connected to the disc supporting wall 164. In another embodiment of the invention, the retaining lip 166 has an inclined upper surface to facilitate the insertion of the disc there past into the disc storage area 126. The release button preferably has a flat upper surface 168 extending laterally from the disc supporting wall 164. The upper surface 168 is dimensioned so as to bend the release button 160, 161 outward when it is depressed by a finger or by an automated machine. The composition and dimensions of the base 162 are selected so as to provide a flexible, pliant release button 160, 161 that bends in order to facilitate the insertion and removal of a disc from the disc storage area 126. Yet the release button 160, 161 must remain sufficiently rigid to retain a disc in the disc storage area 126 when the disc is stored therein. In another embodiment of the present invention, the base 162 of the release button 160, 161 has a cut-out relief 170. The cut-out relief 170 in the base 162 ensures that release button is sufficiently flexible and pliant so as to bend and facilitate the insertion and removal of a disc from a disc storage area 126.

In one embodiment of the present invention, as shown in FIGS. 6 through 11, the base 162 extends outwardly from the floor 127 of the disc storage area 126, in the same plane as the disc storage area. In another embodiment, as shown in FIG. 12, the base 162 is attached to the floor 127 at an angle 172. In the angled embodiment, the base 162 of each of the release buttons 160, 161 extends from the floor 127 of the disc storage area 126 at an angle 172. The base 162 of each of the release buttons 160, 161 extends from a hinge point 174, wherein the distance between the hinge point and the support ring is less than the distance between the hinge point and a center of the disc storage area. Providing the release button at an angle in relation to the floor 127 of the disc storage area 126 facilitates the release button to be depressed sufficiently to effect removal of the disc, even when the disc container is laid upon a flat surface, such as a table top.

The holding members 140, 141 are preferably disposed in holes 132 in the lower housing section 104 so as to facilitate injection molding of the lower housing section 104. Similarly, release buttons 160, 161 are disposed in holes 132 in the lower housing section 104 to facilitate injection molding. Forming the holding members 140, 141 and release buttons 160, 161 in holes 132 also facilitates fabrication of the lower housing section 104 via vacuum forming, if desired.

Thus, according to the present invention, a disc storage container is provided which facilitates easy insertion and removal of a disc by a user in a manner which does not result in the application of substantial stresses to the disc. This is particularly important for multi-layered

1 discs which may become delaminated due to the repeated application of such undesirable stresses thereto during the removal of such discs from contemporary storage containers. As discussed above, the removal of the disc from a contemporary storage container typically results in undesirable bending of the disc in a manner which may cause such delamination.

5 To store a disc in the disc storage container of the present invention, the user depresses the release buttons 160, 161 simultaneously and inserts the disc into the disc storage area from above. The depression of the release buttons 160, 161 causes the buttons to extend outward allowing the disc access to the seat 130 and the disc storage area 126. During insertion of the disc, the force of the disc on the retaining lip 146 of the holding members 140, 141 causes the
10 holding members to bend outward, allowing the disc to be seated on seat 130. Once the disc is seated, the holding members 140, 141 return to the neutral position wherein the retaining lips 146 of the holding members 140, 141 capture the disc and limit the upward movement of the disc seated in the disc storage area 126. Only the unrecorded periphery of the disc contacts the retaining lip 144 of the holding members 140, 141 as the disc is forced downwardly there past.

15 After the holding member 140, 141 have snapped or bent back to the neutral position, the release buttons 160, 161 are released allowing the release buttons to return to a neutral position, as well. In the neutral position, the retaining lip 146 of the release buttons 160, 161 limit the upward movement of the disc seated in the disc storage area. FIG. 10 shows a disc 1 in position to be installed in the disc storage area 126 of the present invention. FIG. 11 shows the disc 1
20 installed in the disc storage area 126, and held in place by the retaining lips 164 of the release buttons 160 and 161. The combination of the holding members 140, 141 and the release buttons 160, 161 ensure that the disc is centered in the disc storage area and securely held in place.

To release the disc, the release buttons 160, 161 are depressed, causing the disc supporting walls 164 to move away from the disc, thus releasing the disc. The depression of one of the
25 buttons 160, 161 is sufficient to release the disc. This feature is advantageous in that the disc storage container can be operated by either a right-handed or left-handed person. Thus, an individual can place his thumb on one of the release buttons 160, 161 and his index finger in the center hole of the disc and pull the disc easily from the case in that manner. The center hole of the disc can easily be accessed by the index finger of a user since there is no centering post to
30 block the access to the center hole of the disc.

It is important to note that as the release buttons are depressed during removal of the disc from the disc storage container of the present invention, the geometry of base 162 with respect to the lower housing section 104 causes the disc supporting wall 164 of the release buttons to move away from the disc without substantially frictionally engaging, e.g., scratching, scraping
35 abrading, or otherwise undesirably contacting the disc.

An important advantage of all embodiments of the disc storage container of the present

1 invention is that it facilitates automated, i.e., machine loading of a disc therein. The disc storage
container may be machine loaded by, for example, using a vacuum gripper to pick up a disc and
to push the disc downwardly into the disc storage area 126 thereby deforming the retaining lips
144 and 166 such that the disc snaps there past. The inclined surface of the lips 144, 166
5 facilitates the outward movement of the arm of the holding members 140, 141 or the base 162
of the release buttons 160, 161. Thus, a disc can be inserted into the disc storage area from
above, such as during packaging of the disc by the disc manufacturer or producer. The design
of the inclined upper surface of the lips 144, 166 is structured to ensure that the holding members
140, 141 or release buttons 160, 161 bend outwards as the disc is installed in the disc storage
10 container. Unlike prior art devices, the holding members 140, 141 or release buttons 160, 161
of the present invention will not bend inward and will not interfere with the installation of the
disc into the disc storage area.

Referring now to FIGS. 13-23, another exemplary embodiment of a disc storage container
210 provided in accordance with practice of the present invention comprises a housing 211
15 having a cover 212, a base 213 and a living hinge member 214. The living hinge member 214
interconnects the cover 212 and the base 213 with two living hinges, 216 and 217.

A raised portion 218 of the base 213 is configured to receive at least one disc, such that
the lowermost disc received thereby rests upon a taper 221 defined by the raised portion 218.
The lower most disc rests upon the taper 221 at the peripheral edge thereof, such that the portion
20 of the bottom surface of the disc where information is stored is spaced apart from the floor 219
of the base 213, preferably by approximately 0.090 inch, so as to prevent undesirable contact of
the bottom of the disc with the disc storage container of the present invention. In this manner,
the likelihood of scratching, abrading or otherwise undesirably damaging the underside of the
disc is substantially mitigated. Further, by supporting the lowermost disc at the periphery thereof
25 and thus providing some clearance between the bottom of the lowermost disc and the floor 219
of the base 213, sufficient room is provided for a user to easily insert a finger or thumb beneath
the disc (between the disc and the floor 219 of the base 213) so as to allow the user to
conveniently lift the disc from the recess 220, as described in detail below.

Preferably, the raised portion 218 comprises a taper 221 which generally surrounds the
30 floor 219 and which defines a concave, generally conical, surface which facilitates self-centering
of a disc, as the disc is being inserted into the recess 220.

The recess 220 is configured so as to receive and contain at least one disc. The recess is
preferably configured so as to receive and contain from one to four discs. However, as those
skilled in the art will appreciate, the recess may be configured so as to receive and contain any
35 desired number of discs. Thus, for example, the recess may be configured so as to receive and
contain one, two, three, four, five, six, or more discs.

1 The raised portion 218 further comprises a top wall 225, a bottom wall 226, a right wall 227 and a left wall 228.

Each of the top wall 225, bottom wall 226, right wall 227, and left wall 228 is configured to inhibit movement of a disc radially out of the recess 220. Thus, the top wall 225, bottom wall 226, right wall 227 and left wall 228 cooperate to maintain any disc(s) contained within the recess 220 therein during an attempt to steal the disc(s) by slitting the cellophane wrapper of the disc storage container 220 and then manipulating the disc storage container 210 so as to remove the disc(s) therefrom.

More particularly, an attempt to bend the disc storage container 210 so as to pop discs contained therein from a central hub is not likely to be successful. The disc storage container of the present invention does not have a central hub from which the discs can be popped or otherwise removed. Further, discs are maintained within the recess 219 of the disc storage container 210 of the present invention by the top 225, bottom 226, right 227, and left 228 walls, even when the disc storage container 210 of the present invention is deformed substantially. Therefore, it is extremely difficult, if not impossible, to remove a disc from the disc storage container of the present invention by slitting the wrapper thereof and then deforming the disc storage container in an attempt to move the disc from the recess and through the slit in the wrapper.

Optionally, a first depression 231 is formed in the raised portion 218 intermediate the top wall 225 and the right wall 227. Optionally, a second depression 232 is similarly formed in the raised portion 218 intermediate the right wall 227 and the bottom wall 226. Both depressions 231 and 232 are configured to facilitate grasping of a disc disposed within the recess 220. That is, both the first and second depressions, 231 and 232, are configured so as to allow a user to insert a thumb or finger underneath one or more disc(s) contained within the recess 220, so as to allow the user to easily lift the disc(s) from the recess 220.

According to a preferred configuration of the present invention, a cover stop 233 is formed to the cover 212 and is configured to inhibit removal of disc(s) from the recess 220 when the cover 212 is closed.

According to a preferred configuration of the present invention, a hinge member stop 234 is formed to the hinge member 214, so as to similarly inhibit removal of disc(s) from the recess 220 when the cover is closed. A notch 236 formed in the left wall 228 receives the hinge member stop 234 when the cover 212 is closed, such that the hinge member stop 234 extends over the top of any disc(s) disposed within the recess 220.

Thus, the cover stop 233 and the hinge member stop 234 cooperate to maintain any disc(s) contained within the recess 220 therein, in a manner which inhibits theft of the disc(s) by slitting the cellophane wrapper and manipulating the disc storage container 210, as described above.

1 Indeed, the top wall 225, bottom wall 226, right wall 227, left wall 228, cover stop 233
and hinge member stop 234, all cooperate with one another in a manner which substantially
mitigates the likelihood of a thief being able to successfully manipulate the disc storage container
210 in a manner which frees any disc from the recess 220 and allows the freed disc to move
5 between the base 213 and the cover 212, such that the disc can slip out of the disc storage
container 210 and through a slit formed in the cellophane disposed thereabout.

 The first latch 41 and a second latch 242 cooperate to keep the disc(s) in the recess 220
when the cover 212 is open (as well as when the cover is closed). The first latch 241 is disposed
proximate the top wall 225. The first latch 241 has an open position and a closed position.
10 Removal of the disc(s) from the recess 220 is inhibited by the first latch 241 when the first latch
241 is in the closed position and is facilitated by the first latch 241 when the first latch 241 is in
the open position.

 Similarly, the second latch 242 is disposed proximate the bottom wall 226. The second
latch 242 also has an open position and a closed position. Removal of disc(s) from the recess 220
15 is inhibited by the second latch when the second latch is in the closed position and is facilitated
by the second latch when the second latch is in the open position.

 Disc(s) disposed within the recess 220 are removable when either one of the first latch and
the second latch is in the open position. Thus, according to the present invention, both right and
left-handed operation of the latches, 241 and 242, is facilitated. That is, a user may use either the
20 user's right-hand or a left-hand to depress either the first latch or the second latch, in order to
effect removal of disc(s) from the recess 220.

 With particular reference to FIG. 23, each latch, 241 and 242, preferably comprises a pair
of flextures, 243 and 244. The flextures, 243 and 244, bend downwardly when the latch is
depressed, so as to allow the latch to move downwardly and thus move the lip 250 of the latch
25 outwardly (away from any discs stored in the recess 220), so as not to interfere with removal of
one or more disc(s) from the recess 220. Outward movement of the lip is enhanced by the latch
pivoting about the connections 249 between the flextures and the remaining portions of the latch.

 Each latch, 241 and 242, further comprises a button 246, which preferably has the word
PRESS formed thereon, so as to make clear the operation of the first and second latches.

30 Opening 248 reduces the amount of force required to bend the flextures 243 and 244, so
as to allow the latches, 241 and 242, to be easily depressed or moved downwardly.

 At least one, preferably a plurality of inwardly extending ribs 247 (FIG. 23) are preferably
formed upon each latch. The ribs 247 are configured so as to contact the periphery of any disc(s)
contained within the recess 220, so as to frictionally engage the disc(s) and thus inhibit rattling
35 thereof, particularly in the instance that the recess 220 contains less than the total number of discs
which may be disposed therein. For example, if the recess 220 is configured to contain a

1 maximum of four discs and the recess 220 actually contains only one disc, then that disc would
tend to be loose in the recess, such that the disc could move up and down or possibly rattle within
the recess. The ribs 247 formed upon each latch, 241 and 242, frictionally engage the periphery
of the disc so as to inhibit substantial vertical movement of the disc within the recess 220, and
5 thereby inhibit the disc from rattling.

Those skilled in the art will appreciate that various different configurations of the opening
248 and/or the flextures 243 and 244 are likewise suitable. Indeed, in some instances it may be
desirable to omit the opening 248 such that one large flexture is provided instead of the two
smaller flextures shown in FIG. 23.

10 Clips, 251 and 252, hold a paper (not shown) within the cover 212 of the disc storage
container 210, as is done according to contemporary practice. Such papers typically comprise
cover art for the disc and/or game instructions, advertising literature, song selections, movie
scenes, etc. Preferably, the top wall 225, bottom wall 226, right wall 227, and left wall 228 each
have a height such that when a paper is disposed in the cover 210 (and held thereby by clips, 251
15 and 252), then the top wall 225, bottom wall 226, right wall 227 and left wall 228 cooperate with
the paper, so as to capture the disc(s) within the recess 220.

Alternatively, the first wall 225, second wall 226, right wall 227, and left wall 228 each
have a height such that a disc cannot move radially out of the recess 220 between any of the
walls, 225, 226, 227, and 228, and the cover 212, when the cover 212 is closed. Cover detent
20 members 261 and 262 are configured to cooperate with base detent members 263 and 264, so as
to releasably latch the cover 212 in the closed position with respect to the base 213.

Ribs 265 enhance the strength of the cover 212 according to well known principles.
Similarly, ribs 266 enhance the strength of the base 213 according to well known principles. The
ribs 265 and 266, at least along one edge (preferably the lower edge) of the disc storage container
210 are preferably formed so as to facilitate stable standing of the disc storage container on end
25 in a half or quarter open position (wherein the cover forms an angle of approximately 45° to 90°
with respect to the base), in an open-book fashion. That is, the ribs 265 and 266 formed along
the lower edge of the disc storage container 210 preferably define feet which provide a stable
contact surface such that the disc storage container may be opened slightly and placed on end
30 upon a table, counter, shelf of the like.

Although the disc storage container of the present invention is shown and described above
as having both a base 213 and a cover 212, those skilled in the art will appreciate that a tray,
which is substantially similar to the base 213, may alternatively be utilized without the associated
cover 212. For example, a number of such trays may be formed in a book-like fashion (wherein
35 another tray is substituted for the cover 212 shown in FIG. 1. Indeed, any desired number of such
trays may be attached to one another, such as in a Z-fold fashion, so as to facilitate the storage

1 of any desired number of discs. Those skilled in the art will appreciate the various different configurations of the present invention are contemplated herein.

Referring particularly to FIG. 24, in one embodiment of the disc storage container 210 of the present invention, a central post 302 extends upwardly from the floor 219 of the recess 220 to inhibit radial movement of disc(s) out of the recess 220. The central post 302 is received within a central opening of a disc and has a diameter which is substantially smaller than the diameter of the central opening of a disc. Therefor, the central post does not engage the disc, as does the hub of a contemporary disc storage container. When such a central post 302 is provided, then the walls 225, 226, 227 and 228 may optionally be provided, as well. The central post has a height similar to that of the walls and functions in a similar manner to retain the disc(s) within the recess and inhibit theft.

The latches, 241 and 241; depressions, 231 and 232; taper 221 and raised portion 218 of the tray 301 are substantially identical to those of FIGS. 13-23. Optionally, walls 225, 226, 227 and 228 are likewise provided for the tray, in a fashion similar to that shown in FIGS. 13-23. Thus, the central post 302, optionally in cooperation with the walls 225, 226, 227 and 228 inhibit movement of any disc(s) contained within the recess 220 in a radial direction, so as to similarly inhibit theft.

Having thus described the structure of the disc storage container 210 of the present invention in detail, it may be beneficial to describe the operation and use thereof. One or more discs are initially loaded into the disc storage container 210 of the present invention utilizing a machine which lowers the discs, preferably one at a time, into the recess 220 of the base 213. Each disc is preferably supported about the periphery thereof as it is lowered passed the latches, 241 and 242. This process is repeated, as necessary, to either fill or partially fill the recess 220 with discs.

A user removes one or more discs from the recess 220 by simply depressing either one of the latches, 241 and 242, and then lifting the desired disc(s) from the recess 220. Because the lowermost disc is spaced apart from the floor 219 of the base 213, a user can simply insert a finger or thumb under the lowermost disc at one of the depressions, 231 or 232, so as to allow the user to conveniently lift the disc(s) from the recess 220.

Typically, a finger or thumb will be inserted into the depression, 231 or 232, which is closest to the latch, 241 or 242, which has been depressed. However, either depression 231 or 232, may be utilized with either latch, 241 or 242, as desired.

Referring to FIGS. 25-27, there is shown yet another embodiment of a storage container 270 provided in accordance with practice of the present invention. The storage container 270 is similar to the container of FIG. 24 except that the floor 219 is absent. Turning particularly to FIGS. 25 and 26, the storage container 270 comprises a generally rectangular frame 272 including

1 a top side 274, a bottom side 278, a left side 282 and a right side 286. The frame is defined by
four contiguous walls, a top wall 275 extending along its top side, a bottom wall 279 extending
along its bottom side and side walls 283 and 287 extending along the left and right sides
respectively. Each wall comprises a front side surface, 277, 281, 289 and 293 respectively, and
5 an outside surface, 273, 285, 291 and 295 respectively. Additionally, the frame 272 includes first
and second ledges, 276 and 280, that extend along cutout portions, 297 and 299, in the top and
bottom walls, 275 and 279. Third and fourth ledges, 284 and 288, extend along the base of the
side walls, 283 and 287 respectively. The combination of the first, second, third and fourth
ledges, 276, 280, 284 and 288 respectively, create a recess 269 within the frame 272 for
10 supporting a disc in the container 270. The recess is preferably configured so as to receive and
contain from one to four discs. However, as those skilled in the art will appreciate, the recess
may be configured so as to receive and contain any desired number of discs. Thus, for example,
the recess may be configured so as to receive and contain one, two, three, four, five, six, or more
discs. In one embodiment, the storage container 270 is injection molded from polystyrene,
15 polypropylene or any other suitable plastic material.

Preferably, the left and right walls, 283 and 287, include semi-circular cutout portions, 290
and 292, and the third and fourth ledges, 284 and 288, include tapers, 294 and 296, which are
sloped slightly downwards from cutout portions, 290 and 292, towards the recess 269. This
facilitates self-centering of a disc, as the disc is being inserted into the recess 269. Additionally,
20 it is preferable that the first and second ledges, 276 and 280, also define a tapered surface which
facilitate self-centering of a disc, as the disc is being inserted into the recess 269.

Each of the top wall 275, bottom wall 279, left wall 283, and right wall 287 is configured
to inhibit movement of a disc radially out of the recess 269. Thus, top wall 275, bottom wall 279,
left wall 283, and right wall 287 cooperate to maintain the disc contained within the recess 269.

25 A first latch 298 and a second latch 400, oppositely disposed on the frame 272, cooperate
to keep the disc in the recess 269. Each latch, 298 and 400, includes a vertically extending wall,
412a and 414a respectively. Lips, 412b and 414b, extend horizontally from the vertically
extending walls, 412a and 414a, respectively, and inwardly toward the center of the recess 269.
The top surface of the lips are sloped so when the periphery of a disc contacts the top surface of
30 the lips and is urged downwards, the latches bend out of the way facilitating insertion of the disc.
Pairs of flexures, 404, 406 and 408, 410 connect the latches, 298 and 400 respectively, to the
frame 272 at the base portion of the first and second ledges, 276 and 280.

The flexures bend downwardly when each latch is depressed, so as to allow each latch
to move downwardly and thus move the respective lips 412b and 414b of each latch outwardly
35 (away from any disc stored in the recess 269), so as not to interfere with removal a disc from the
recess 269. Outward movement of the lips is enhanced by the latches pivoting about the

1 connections 415 between the flextures and the remaining portion of the latches. The lips, 412b
and 414b, are configured so as to contact the periphery or an unrecorded portion of any disc
contained in the recess 269, so as to frictionally engage the disc and thus inhibit vertical
movement of the disc within the recess 269. Openings, 416 and 418, reduce the amount of force
5 required to bend the flextures, 404, 406, 408 and 410, so as to allow the latches, 298 and 400, to
be easily depressed or moved downwardly. The first latch 298, which is disposed proximate the
top side 274 of the frame, has an open position and a closed position. Removal of the disc from
the recess 269 is inhibited by the first latch 298 when the first latch is in the closed position and
is facilitated by the first latch when the first latch is in the open position.

10 Similarly, the second latch 400, which is disposed proximate the bottom side 278 of the
frame, also has an open position and a closed position. Removal of a disc from the recess 269
is inhibited by the second latch 400 when the second latch is in the closed position and is
facilitated by the second latch when the second latch is in the open position.

15 To insert a disc into the storage container 270, the disc is urged downward into the frame.
This causes the periphery of the disc to contact the top surface of the lips, 412b and 414b, of the
latches, 298 and 400, causing the latches to bend out of the way facilitating insertion of the disc
onto the frame 272 from above. When the periphery of the disc moves past the lips, 412b and
414b, the latches, 298 and 400, snap or bend back to their original positions so as to capture the
disc.

20 A disc disposed within the recess 269 is removable when either the first latch 298 or the
second latch 400 or both are in the open position. Thus, according to the present embodiment,
both right and left-handed operation of the latches, 298 and 400, is facilitated. That is, a user
may use either the user's right-hand or a left-hand to depress either the first latch 298 or the
second latch 400, in order to effect removal of a disc from the recess 269.

25 Those skilled in the art will appreciate that various different configurations of the openings
416 and 418 and/or the flextures, 404, 406, 408, 410, are likewise suitable. Indeed, in some
instances it may be desirable to omit the openings 416 and 418 such that one large flexture is
provided instead of the two smaller flextures shown in FIG. 25.

30 Turning now to FIG. 27, a bottom view of the disc storage container 270 is shown. The
bottom surface of the storage container 270 comprises a bottom edge 423 on each of its four sides
and four generally cylindrical pillars, 424, 426, 428 and 430, one of which is located in each
corner. In the illustrated embodiment, each pillar has an outer cylindrical surface 425, 429, 433
and 437 respectively, and an inner cylindrical surface, 427, 431, 435 and 439 respectively,
connected via four ribs 241, 242, 243 and 244. In one embodiment, adhesive is applied to
35 openings, 432, 434, 436 and 438, to adhere the container 270 to a base or backing material (not
shown), such as a piece of cardboard or the like.

1 A number of the containers described with reference to FIGS. 25-27 may also be formed
in a book-like fashion by binding a common edge of each container. Indeed, any desired number
of such containers may be attached to one another, such as in a Z-fold fashion, so as to facilitate
the storage of any desired number of discs.

5 Referring again to FIGS. 25 and 26, in addition to FIG. 27, in the illustrated embodiment,
the container 270 includes a stepped surface forming a stacking ledge 440 that extends outwardly
from each wall, 275, 279, 283 and 287, and extends around the periphery of the frame 272. In
a preferred embodiment, the width of the stacking ledge 440 is equal to the thickness of the
bottom edge 423 of the frame 272 to allow for a number of containers 270 to be stacked on top
10 of each other. Furthermore, each pillar is located on the bottom surface of the top or bottom
walls, 275 and 279, and is configured so that the bottom surface of each pillar is recessed into
the container the same distance as the height of the stacking ledge 440. This allows the frame's
bottom edge 423 to contact the stacking ledge around the periphery of the frame when one
container is stacked on top of another. The design of the stacking ledge and the from bottom
15 edge 423 accommodate the stacking of any number of containers one on top of the other.

Those skilled in the art will appreciate the various different configurations of the present
invention are contemplated herein. It is to be understood that the exemplary disc storage
containers described herein and shown in the drawings represent only presently preferred
embodiments of the container provided in accordance with the present invention.

20 The scope of the invention is defined in the following claims.

1 WHAT IS CLAIMED IS:

1. A disc storage container for storing a disc having a center with a hole therein, the disc storage container comprising:

5 a tray having a disc storage area formed therein, wherein the disc storage area has a floor and is circular in shape, and wherein the disc storage area is dimensioned to store the disc when the center of the disc is aligned with a center of the disc storage area;

a supporting wall, at least partially surrounding the disc storage area;

10 a centering post positioned at the center of the floor of the disc storage area and dimensioned to receive the hole of the disc when the disc is placed in the disc storage area;

a plurality of holding members configured to move outwardly in relation to the disc storage area, each holding member having an arm attached to the floor of the disc storage area and a disc supporting wall extending laterally from the arm, each holding member disposed in an opening in the tray so as to contact the tray via the arm;

15 a lip provided on the disc supporting wall for inhibiting upward movement of the disc when the disc is seated in the disc storage area; and

a plurality of recesses dimensioned to allow access to the disc for removal of the disc from the disc storage area.

20 2. A disc storage container in accordance with claim 1 wherein the plurality of holding members comprises a first, a second, a third and a fourth holding member, wherein the first and the third holding members are located diametrically opposed to each other, and the second and the fourth holding members are located diametrically opposed to each other.

25 3. A disc storage container in accordance with claim 2 wherein the distance between the first and second holding members is greater than the distance between the second and the third holding members.

30 4. A disc storage container in accordance with claim 3 wherein the plurality of recesses comprises a first, a second, a third, and a fourth recess, wherein each recess is positioned proximate a respective holding member.

35 5. A disc storage container in accordance with claim 4 wherein the each of the recesses has a semi-circular shape and wherein the first and third recesses are positioned diametrically opposed to each other, and the second and fourth recesses are positioned diametrically opposed to each other.

1 6. A disc storage container in accordance with claim 1, further comprising a support tab extending from the tray into the opening toward one of the plurality of holding members so as to limit the outward movement of the holding member.

5 7. A disc storage container in accordance with claim 1, comprising a groove on an edge of the tray.

 8. A disc storage container in accordance with claim 1 wherein the disc storage container is injection molded as an integrally formed unit.

10 9. A disc storage container in accordance with claim 8 wherein the disc storage container is injection molded of a clear polymer material.

15 10. A storage container for storing an optical disc, the storage container comprising:
a lower housing section;
a support ring disposed on the lower housing section, the support ring having four support ring portions that collectively define a disc storage area, each support ring portion separated from another support ring portion by a hole in the lower housing section;
a pair of release buttons configured to move outwardly with respect to the disc storage area, each release button disposed in one of the holes in the lower housing section, the release button having a base attached to a floor of the disc storage area and a disc supporting wall laterally extending from the base, wherein the disc supporting wall includes a retaining lip for inhibiting the movement of the optical disc seated in the disc storage area, and wherein each release button further comprises an upper surface, the depression of which facilitates the removal
20 of the disc; and
25 a first and second holding members, each holding member disposed in one of the holes in the lower housing section and having an arm attached to the floor of the disc storage area and a disc supporting wall laterally extending from the arm, wherein the disc supporting wall includes a retaining lip for inhibiting the movement of optical discs seated in the disc storage area.

30 11. A storage container in accordance with claim 10, wherein the support ring comprises a projecting portion having a flattened top surface that defines a seat for the optical disc.

35 12. A storage container in accordance with claim 10 wherein each hole is spaced at a 90 degree angle from at least one the other hole.

1 13. A storage container in accordance with claim 12 wherein the release buttons are disposed in respective holes that are located diametrically opposed to each other.

5 14. A storage container in accordance with claim 13 wherein the holding members are disposed in respective holes that are located diametrically opposed to each other.

 15. A storage container in accordance with claim 1 wherein the base of the release button has a relief cut-out therein.

10 16. A storage container in accordance with claim 1 wherein the arm of the holding member has a relief cut-out therein.

15 17. A storage container in accordance with claim 14 further comprising, an upper housing section and a hinge panel connecting the upper housing section to the lower housing section.

 18. A storage container in accordance with claim 17 wherein the hinge panel comprises a raised portion thereon located so as to bear against the first holding member when the storage container is in a closed configuration.

20 19. A storage container in accordance with claim 18 further comprising an upper flange on the upper housing section that corresponds to and mates with a lower flange on the lower housing section when the storage container is in the closed configuration, the lower flange having a raised portion thereon located such that the raised portion of the lower flange bears against the second holding member when the storage container is in the closed configuration.

25 20. A storage container in accordance with claim 19 wherein the upper flange comprises an upper concave portion and the lower flange comprises a lower concave portion, wherein in the closed configuration, the upper and lower concave portions form an indentation to facilitate the opening of the storage container.

30 21. The storage container in accordance with claim 10 wherein the base of each of the release buttons extends from the floor of the disc storage area at an angle.

35 22. The storage container in accordance with claim 21 wherein the base of each of the release buttons extends from a hinge point, wherein the distance between the hinge point and the

1 support ring is less than the distance between the hinge point and a center of the disc storage area.

23. A method for inserting a disc into a disc storage container, the method comprising the steps of:

5 providing a disc storage container having a disc storage area, a pair of holding members, and a pair of release buttons;

holding a disc from above about at least a portion of the periphery thereof over the disc storage area;

10 pushing the disc downwardly so as to deform at least one of the holding members and the release buttons so as to insert the disc into the disc storage area of the disc storage container.

24. A method in accordance with claim 23, wherein the step of holding a disc comprises holding the disc with a vacuum.

15 25. A method in accordance with claim 23 wherein the step of pushing the disc downwardly so as to deform at least one of the holding members and the release buttons comprises pushing the disc downwardly to extend the holding members and the release buttons outwardly.

20 26. A method in accordance with claim 23 wherein the step of pushing the disc downwardly so as to deform at least one of the holding members and the release buttons comprises pushing the disc downwardly so as to snap past a plurality of retaining lips, the retaining lips being configured to so as to inhibit the movement of the disc when the disc is seated in the disc storage area.

25 27. A method of removing a disc from a disc storage container, comprising the steps of:

providing a disc storage container having a disc storage area, a pair of holding members, and a pair of release buttons;

30 depressing the release buttons simultaneously; and
removing the disc from the disc storage area from above.

28. A disc storage container comprising:

35 a housing having a cover, a base and a hinge member interconnecting the cover and the base via two living hinges, the cover having an open position and a closed position with respect to the base;

1 a raised portion of the base defining a recess which is configured to receive at least one disc; and

at least one stop formed upon the housing and configured to inhibit removal of the disc from the recess when the cover is closed.

5 29. The disc storage container as recited in claim 28, wherein the stop(s) comprise a cover stop formed to the cover and configured to inhibit removal of the disc from the recess when the cover is closed.

10 30. The disc storage container as recited in claim 28, wherein the stop(s) comprise a hinge member stop formed to the hinge member and configured to inhibit removal of the disc from the recess when the cover is closed.

15 31. The disc storage container as recited in claim 28, wherein the stop(s) comprise a cover stop defined by a protrusion formed upon the cover.

32. The disc storage container as recited in claim 28, wherein the stop(s) comprise a hinge member stop defined by a protrusion formed upon the hinge member.

20 33. The disc storage container as recited in claim 28, wherein the stop(s) comprise:
a cover stop defined by a protrusion formed upon the cover; and
a hinge member stop defined by a protrusion formed upon the hinge member.

25 34. The disc storage container as recited in claim 28, wherein raised portion comprises:
a top wall;
a bottom wall;
a right wall;
a left wall; and

30 wherein the top wall, the bottom wall, the right wall and the left wall are configured to inhibit radial movement of a disc out of the recess when the cover is closed.

35 35. The disc storage container as recited in claim 28, further comprising:
a first latch having an open position and a closed position, wherein removal of the disc from the recess is inhibited by the first latch when the first latch is in the closed position and wherein removal of the disc from the recess is facilitated by the first latch when the first latch is in the open position;

1 a second latch having an open position and a closed position, wherein removal of the disc
from the recess is inhibited by the second latch when the second latch is in the closed position
and wherein removal of the disc from the recess is facilitated by the second latch when the
second latch is in the open position; and

5 wherein a disc disposed within the recess is removable when only one of the first latch and
the second latch is in the open position, thus facilitating both right and left handed operation of
the latches.

36. The disc storage container as recited in claim 28, wherein the raised portion further
10 comprises a taper formed substantially around the floor of the recess and configured to facilitate
self-centering of a disc being inserted into the recess.

37. The disc storage container as recited in claim 28, wherein the recess is configured
to receive a plurality of discs.

15 38. The disc storage container as recited in claim 28, wherein the recess is configured
to receive two discs.

39. The disc storage container as recited in claim 28, wherein the recess is configured
20 to receive three discs.

40. The disc storage container as recited in claim 28, wherein the recess is configured
to receive four discs.

25 41. A disc storage container comprising:
a base;
a raised portion of the base defining a recess which is configured to receive at least one
disc;

30 a first latch having an open position and a closed position, wherein removal of the disc
from the recess is inhibited by the first latch when the first latch is in the closed position and
wherein removal of the disc from the recess is facilitated by the first latch when the first latch is
in the open position;

35 a second latch having an open position and a closed position, wherein removal of the disc
from the recess is inhibited by the second latch when the second latch is in the closed position
and wherein removal of the disc from the recess is facilitated by the second latch when the
second latch is in the open position; and

1 wherein a disc disposed within the recess is removable when only one of the first latch and
the second latch is in the open position, thus facilitating both right and left handed operation of
the latches.

5 42. The disc storage container as recited in claim 41, wherein the base defines a tray.

 43. The disc storage container as recited in claim 41, further comprising a cover and
wherein the top wall, bottom wall, right wall and the left wall have a height which inhibits radial
movement of the disc out of the recess when the cover is closed.

10 44. The disc storage container as recited in claim 41, further comprising a cover and
a hinge member interconnecting the cover and the base via two living hinges, the cover having
an open position and a closed position with respect to the base.

15 45. The disc storage container as recited in claim 41, wherein the first and second
latches are disposed at approximately diametrically opposed positions with respect to the recess.

20 46. The disc storage container as recited in claim 41, wherein at least one of the first
and second latches comprises a push tab which is configured to release a disc when pushed, the
push tab comprising a generally planar tab and a lip, the lip inhibiting movement of the disc
unless the planar tab is depressed.

 47. The disc storage container as recited in claim 41, further comprising:
a cover;
25 a cover stop formed to the cover and configured to inhibit removal of the disc from the
recess when the cover is closed;
a hinge member; and
a hinge member stop formed to the hinge member and configured to inhibit removal of
the disc from the recess when the cover is closed.

30 48. The disc storage container as recited in claim 41, wherein the raised portion further
comprises a taper formed substantially around the floor of the recess and configured to facilitate
self-centering of a disc being inserted into the recess.

35 49. The disc storage container as recited in claim 41, wherein the recess is configured
to receive a plurality of discs.

1 50. A disc storage container comprising:

 a base; and

 a raised portion of the base defining a recess which is configured to receive at least one
disc, the recess having a floor and the raised portion comprising a taper formed substantially
5 around the floor of the recess and configured to facilitate self-centering of a disc being inserted
into the recess.

 51. A disc storage container for storing a CD, CD-ROM, CD-R, CD-RW, DVD, DVD-
R, DVD-RAM or the like, the disc storage container comprising:

10 a housing having a cover, a base and a living hinge member interconnecting the cover and
the base via two living hinges;

 a raised portion of the base defining a recess which is configured to receive at least one
disc, the recess having a floor and the raised portion comprising:

 a taper formed substantially around the floor of the recess and configured to
15 facilitate self-centering of a disc being inserted into the recess;

 a top wall configured to inhibit movement of a disc radially out of the recess;

 a bottom wall configured to inhibit movement of a disc radially out of the recess;

 a right wall configured to inhibit movement of a disc radially out of the recess;

 a left wall configured to inhibit movement of a disc radially out of the recess;

20 a first depression configured to facilitate grasping of a disc disposed within the recess
formed in the raised portion intermediate the top wall and the right wall;

 a second depression configured to facilitate grasping of a disc disposed within the recess
formed in the raised portion intermediate the right wall and the bottom wall;

25 a cover stop formed to the cover and configured to inhibit removal of the disc from the
recess when the cover is closed;

 a hinge member stop formed to the hinge member and configured to inhibit removal of
the disc from the recess when the cover is closed;

 a first latch disposed proximate the top wall, the first latch having an open position and
a closed position, wherein removal of the disc from the recess is inhibited by the first latch when
30 the first latch is in the closed position and wherein removal of the disc from the recess is
facilitated by the first latch when the first latch is in the open position;

 a second latch disposed proximate the bottom wall, the second latch having an open
position and a closed position, wherein removal of the disc from the recess is inhibited by the
second latch when the second latch is in the closed position and wherein removal of the disc from
35 the recess is facilitated by the second latch when the second latch is in the open position;

 wherein a disc disposed within the recess is removable when only one of the first latch and

1 the second latch is in the open position, thus facilitating both right and left handed operation of the latches.

5 52. The disc storage container as recited in claim 51, wherein the recess is configured to receive a plurality of discs.

53. A disc storage container for storing a CD, CD-ROM, CD-R, CD-RW, DVD, DVD-R, DVD-RAM or the like, the disc storage container comprising:

10 housing means having a cover, a base and a living hinge member interconnecting the cover and the base via two living hinges;

a raised portion of the base defining a recess which is configured to receive at least one disc, the recess having a floor and the raised portion comprising:

means for centering a disk formed substantially around the floor of the recess;

a top wall configured to inhibit movement of a disc radially out of the recess;

15 a bottom wall configured to inhibit movement of a disc radially out of the recess;

a right wall configured to inhibit movement of a disc radially out of the recess;

a left wall configured to inhibit movement of a disc radially out of the recess;

a first depression configured to facilitate grasping of a disc disposed within the recess formed in the raised portion intermediate the top wall and the right wall;

20 a second depression configured to facilitate grasping of a disc disposed within the recess formed in the raised portion intermediate the right wall and the bottom wall;

means for inhibiting removal of the disc from the recess when the cover is closed formed to the cover;

25 means for inhibiting removal of the disc from the recess when the cover is closed, formed to the hinge member;

30 a first means for latching a disc within the recess disposed proximate the top wall, the first latch having an open position and a closed position, wherein removal of the disc from the recess is inhibited by the first latch when the first latch is in the closed position and wherein removal of the disc from the recess is facilitated by the first latch when the first latch is in the open position;

35 a second means for latching a disc within the recess disposed proximate the top wall, the second latch having an open position and a closed position, wherein removal of the disc from the recess is inhibited by the second latch when the second latch is in the closed position and wherein removal of the disc from the recess is facilitated by the second latch when the second latch is in the open position;

wherein a disc disposed within the recess is removable when only one of the first latch and

1 the second latch is in the open position, thus facilitating both right and left handed operation of the latches.

5 54. A method for inserting a disc into a storage container, the method comprising:
holding a disc above a base of the storage container;
supporting the disc about at least a portion of the periphery thereof; and
moving the disc toward the base of the storage container to deform at least one of two substantially diagonally opposed latches so as to place the disc within a recess of the container.

10 55. The method as recited in claim 54, further comprising repeating the holding, supporting and moving steps so as to place a plurality of discs into the recess of the container.

15 56. A method for removing a disc from a storage container, the method comprising:
selecting one of two different buttons formed to a housing;
depressing the selected button;
grasping a periphery of the disc; and
lifting the disc out of a recess defined by a raised portion of a base.

20 57. The method as recited in claim 56, wherein grasping a periphery of the disc comprises grasping a periphery of the disc with an opposite hand from a hand with which the button is depressed.

25 58. The method as recited in claim 56, wherein grasping a periphery of the disc comprises grasping a periphery of the disc using a cutout form in a raised portion of the base that generally surrounds the disc.

59. The method as recited in claim 56, further comprising repeatedly depressing the selected button to facilitate removal of a plurality of discs from the storage container.

30 60. A disc storage container comprising:
a frame;
at least two ledges formed upon the frame defining a recess configured to receive a disc;
a first latch and a second latch formed upon the frame; and
35 wherein the first and second latches are configured to bend out of the way when a disc is inserted into the frame from above.

1 61. The disc storage container as recited in claim 60, wherein the first and second
 latches are disposed so as to generally define a semicircle about a disc disposed upon the frame.

5 62. The disc storage container as recited in claim 60, wherein the bottom of the frame
 has at least two cylindrical pillars mounted therein.

10 63. The disc storage container as recited in claim 60, wherein the first latch has an open
 position and a closed position, wherein removal of a disc from the recess is inhibited by the first
 latch when the first latch is in the closed position and wherein removal of the disc from the recess
 is facilitated by the first latch when the first latch is in the open position;

 wherein the second latch has an open position and a closed position, wherein
 removal of the disc from the recess is inhibited by the second latch when the second latch is in
 the closed position and wherein removal of the disc from the recess is facilitated by the second
 latch when the second latch is in the open position; and

15 wherein a disc disposed within the recess is removable when only one of the first
 latch and the second latch is in the open position, thus facilitating both right and left handed
 operation of the latches.

20 64. The disc storage container as recited in claim 60, wherein the first and second
 latches are configured to facilitate both right and left handed operation of one thereof.

 65. The disc storage container as recited in claim 60, wherein the first and second
 latches are disposed at opposed positions with respect to the recess.

25 66. The disc storage container as recited in claim 60, wherein each ledge further
 comprises a taper configured to facilitate self-centering of a disc being inserted into the recess.

30 67. The disc storage container as recited in claim 60, wherein the first and second
 latches are configured to contact the disc only at an unrecorded portion thereof.

 68. The disc storage container as recited in claim 60, wherein the first and second
 latches are formed integrally with the frame.

35 69. The disc storage container as recited in claim 60, wherein the frame is substantially
 rectangular.

1 70. A disc storage container comprising:
 a frame; and
 at least two ledges formed upon the frame defining a recess configured to receive
a disc, the recess comprising a taper formed substantially upon the recess and configured to
5 facilitate self-centering of a disc inserted into the recess.

 71. The disc storage container as recited in claim 70, further comprising a first latch
and a second latch formed upon the frame, wherein the first and second latches are configured
to bend out of the way when a disc is inserted into the frame from above.

10 72. The disc storage container as recited in claim 70, wherein the first and second
latches are disposed so as to generally define a semicircle about a disc disposed upon the frame.

 73. The disc storage container as recited in claim 70, wherein the bottom of the frame
15 has at least two cylindrical pillars mounted therein.

 74. The disc storage container as recited in claim 71, wherein the first latch has an open
position and a closed position, wherein removal of a disc from the recess is inhibited by the first
latch when the first latch is in the closed position and wherein removal of the disc from the recess
20 is facilitated by the first latch when the first latch is in the open position;

 wherein the second latch has an open position and a closed position, wherein
removal of the disc from the recess is inhibited by the second latch when the second latch is in
the closed position and wherein removal of the disc from the recess is facilitated by the second
latch when the second latch is in the open position; and

25 wherein a disc disposed within the recess is removable when only one of the first
latch and the second latch is in the open position, thus facilitating both right and left handed
operation of the latches.

 75. The disc storage container as recited in claim 70, wherein the first and second
30 latches are configured to facilitate both right and left handed operation thereof.

 76. The disc storage container as recited in claim 71, wherein the first and second
latches are configured disposed at opposed positions with respect to the recess.

35 77. The disc storage container as recited in claim 71, wherein the first and second
latches are configured to contact the disc only at an unrecorded portion thereof.

1 78. The disc storage container as recited in claim 71, wherein the first and second
latches are formed integrally with the frame.

5 79. The disc storage container as recited in claim 70, wherein the frame is substantially
rectangular.

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FIG. 1

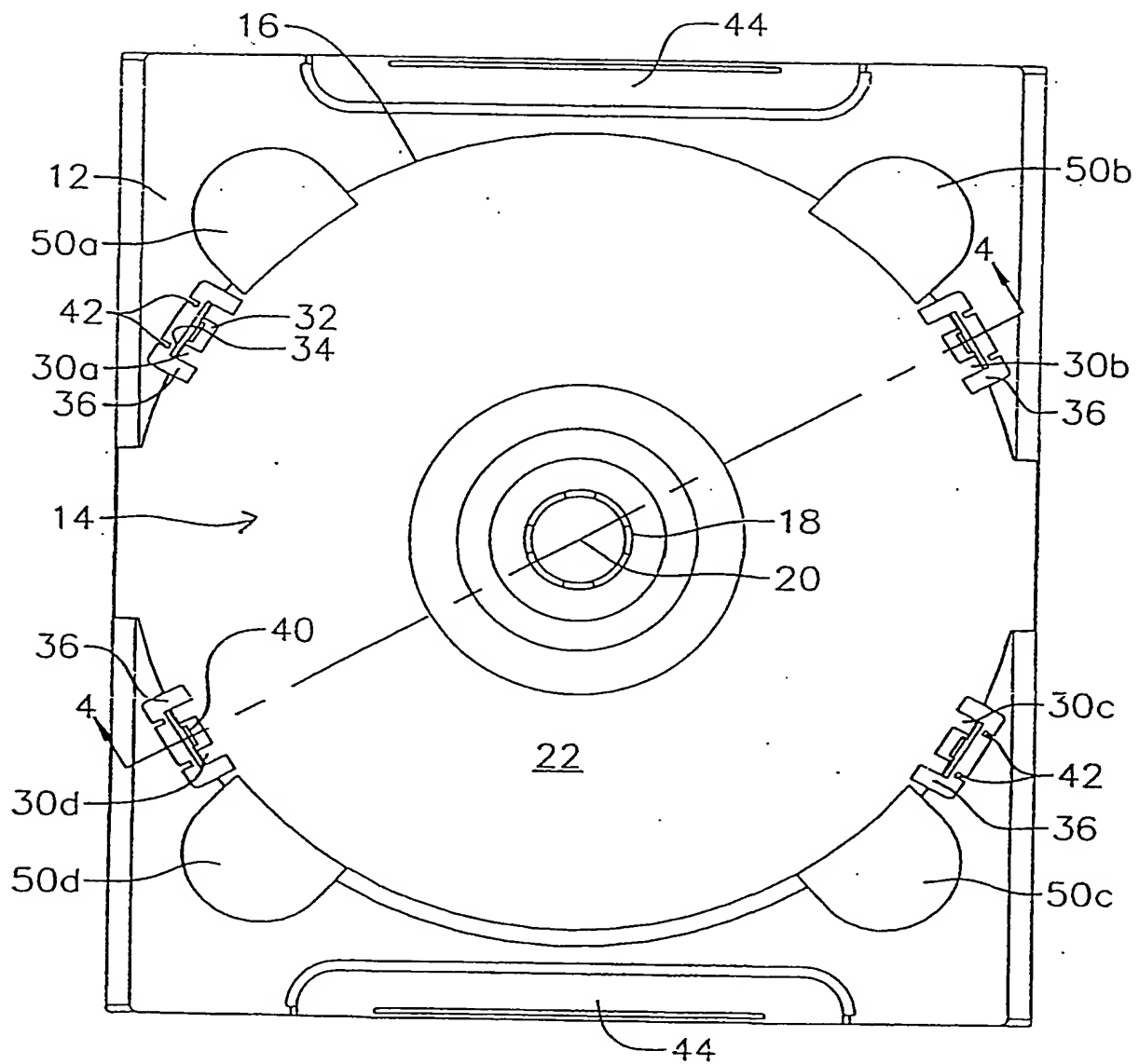
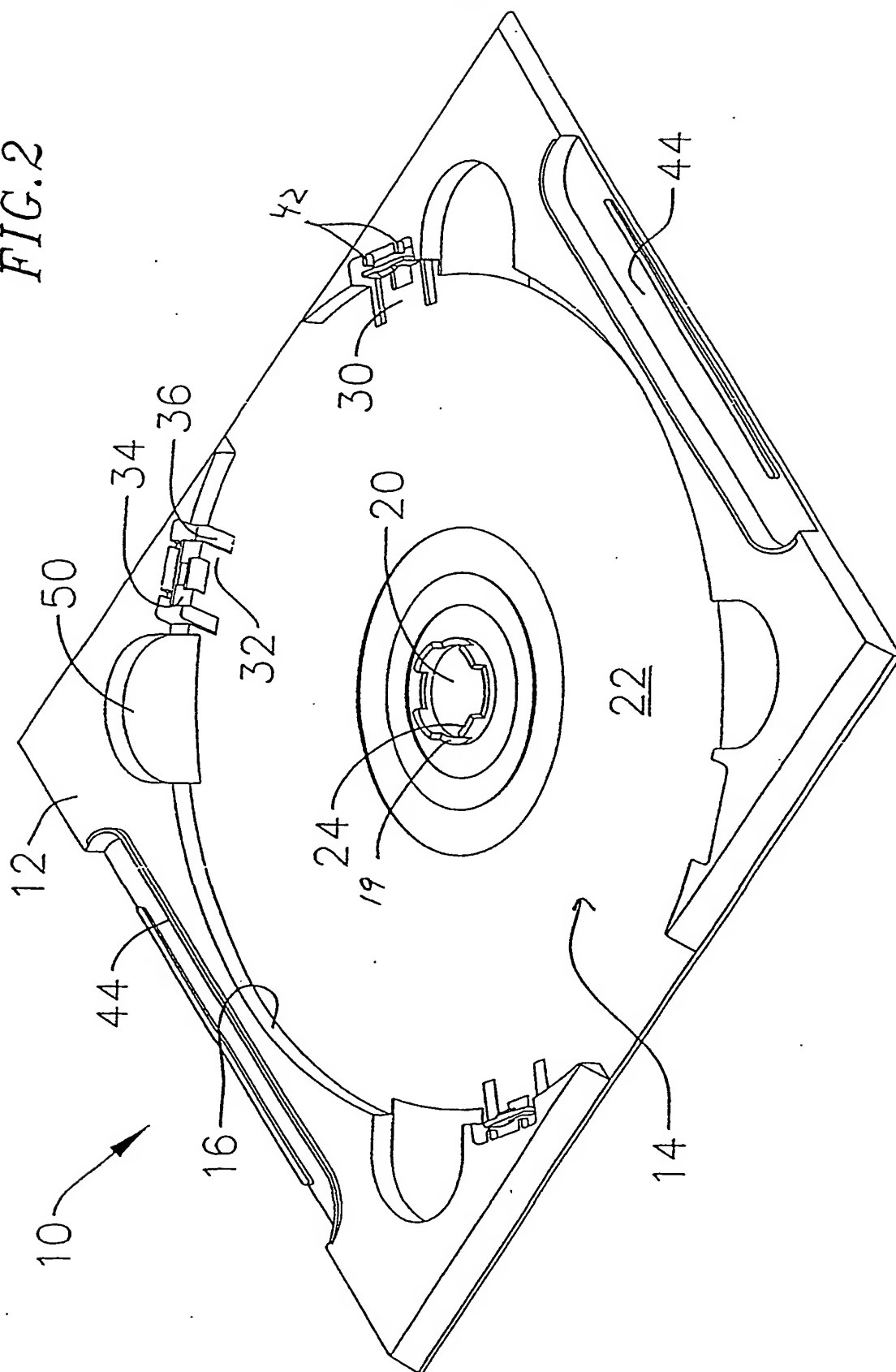


FIG. 2



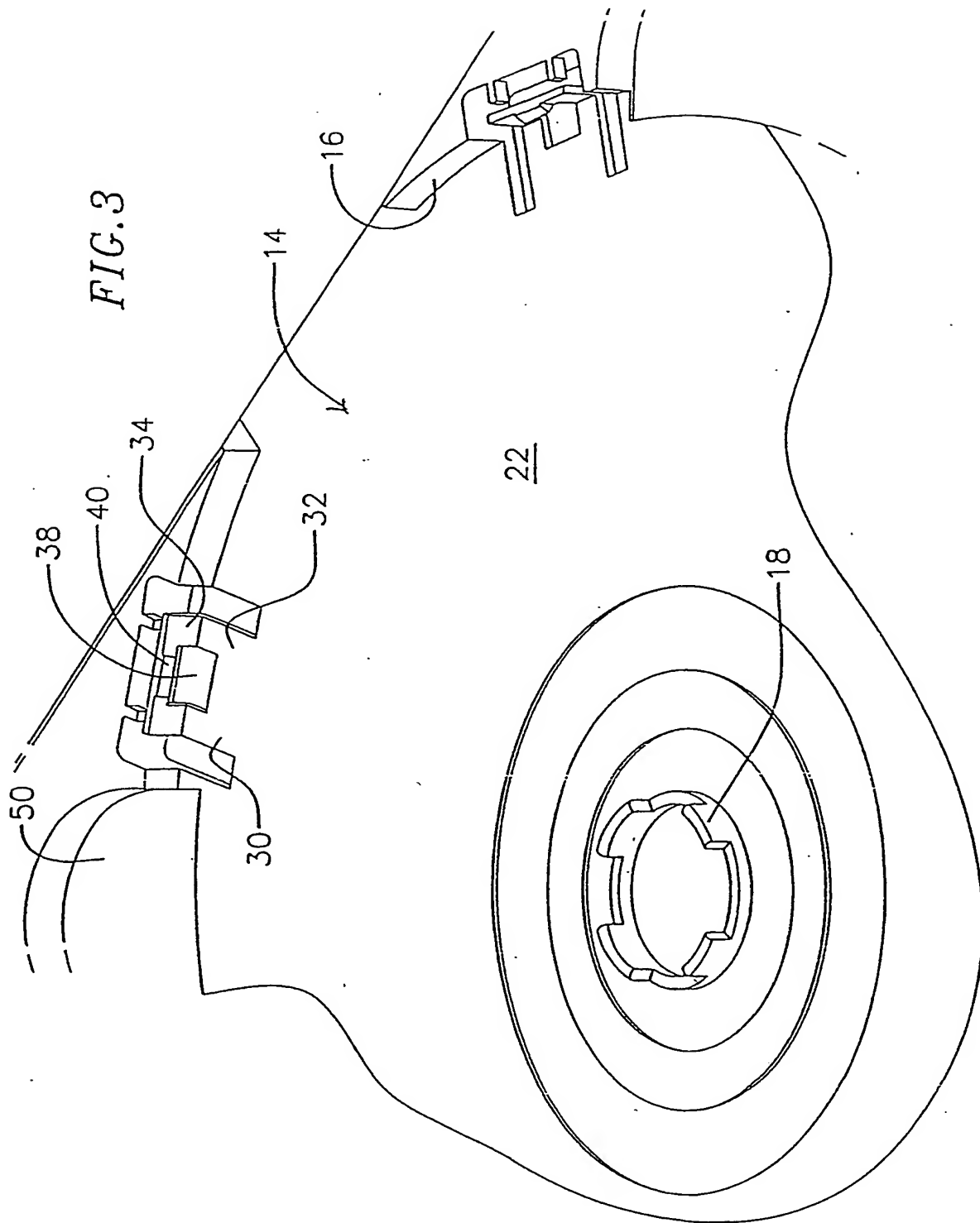


FIG. 4

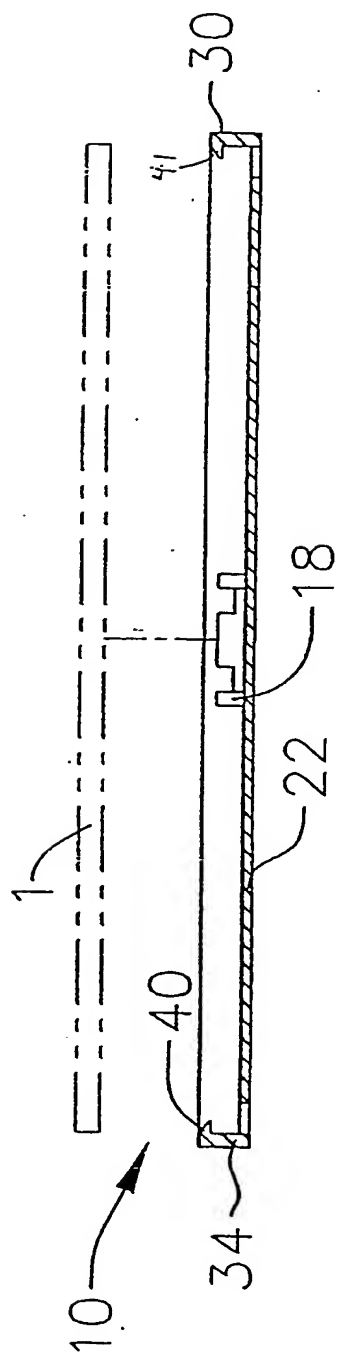
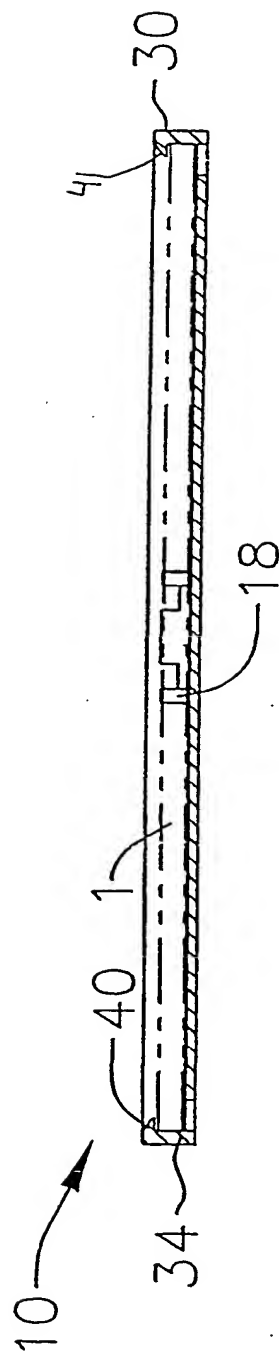


FIG. 5



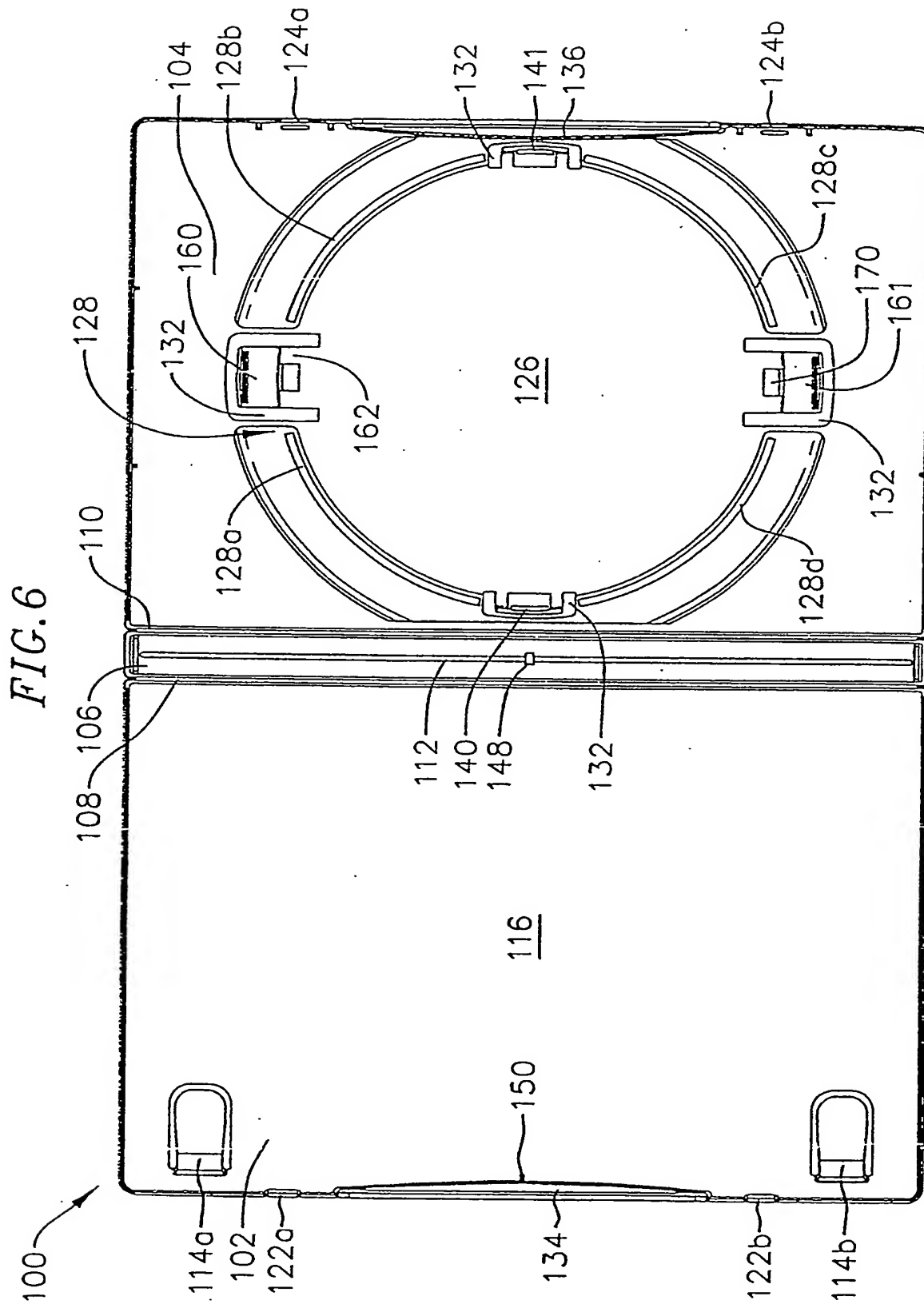
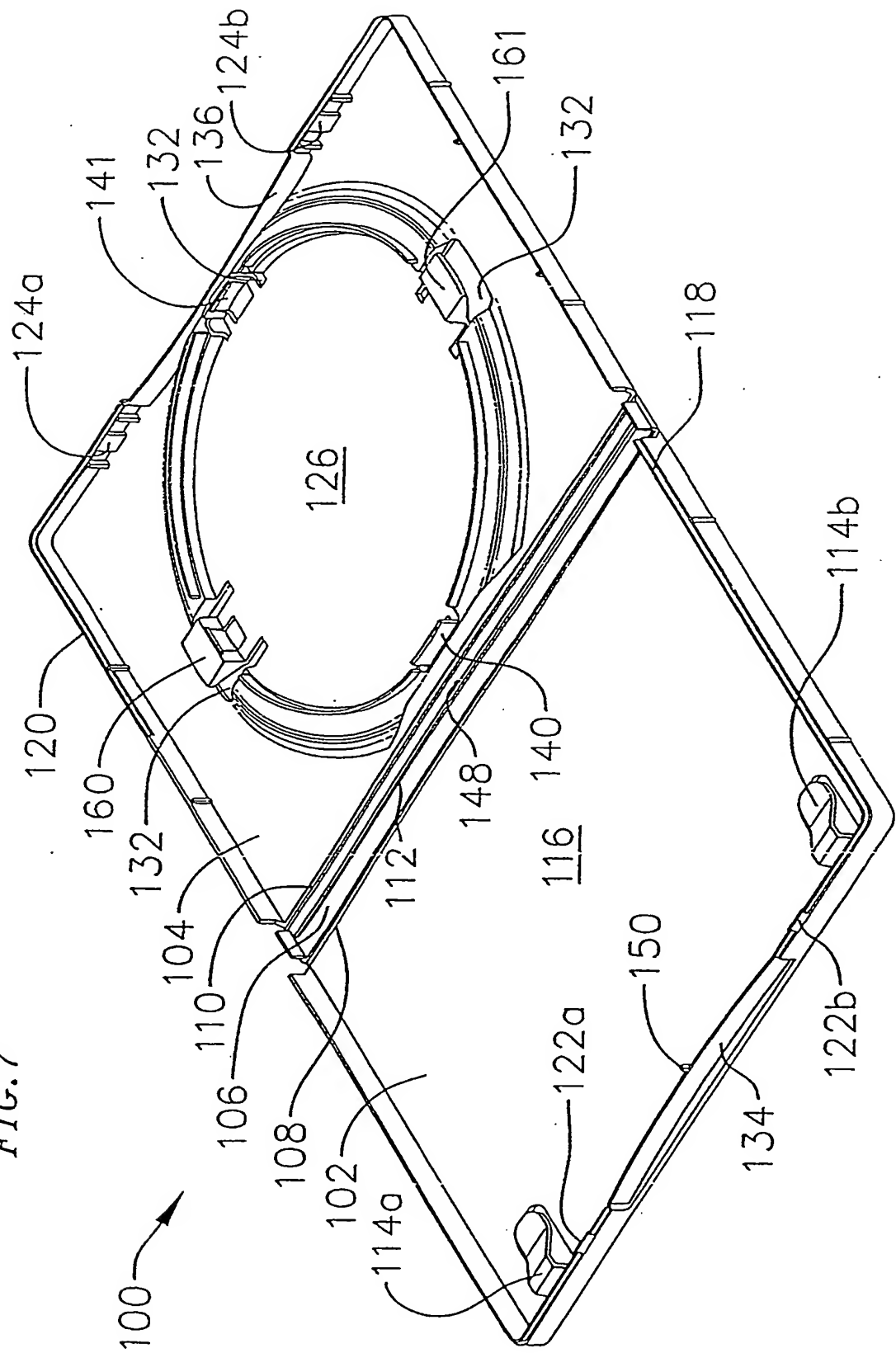
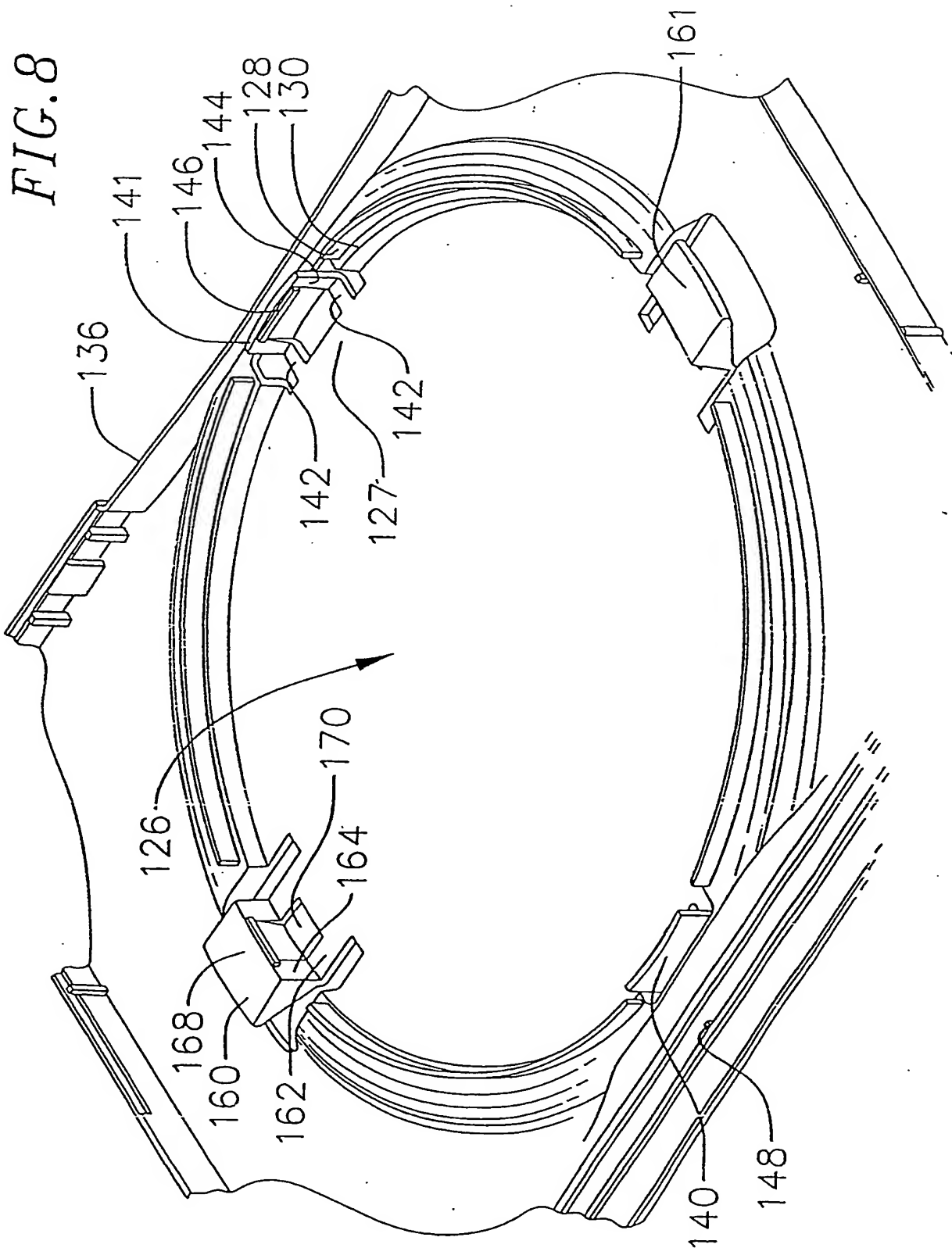


FIG. 7





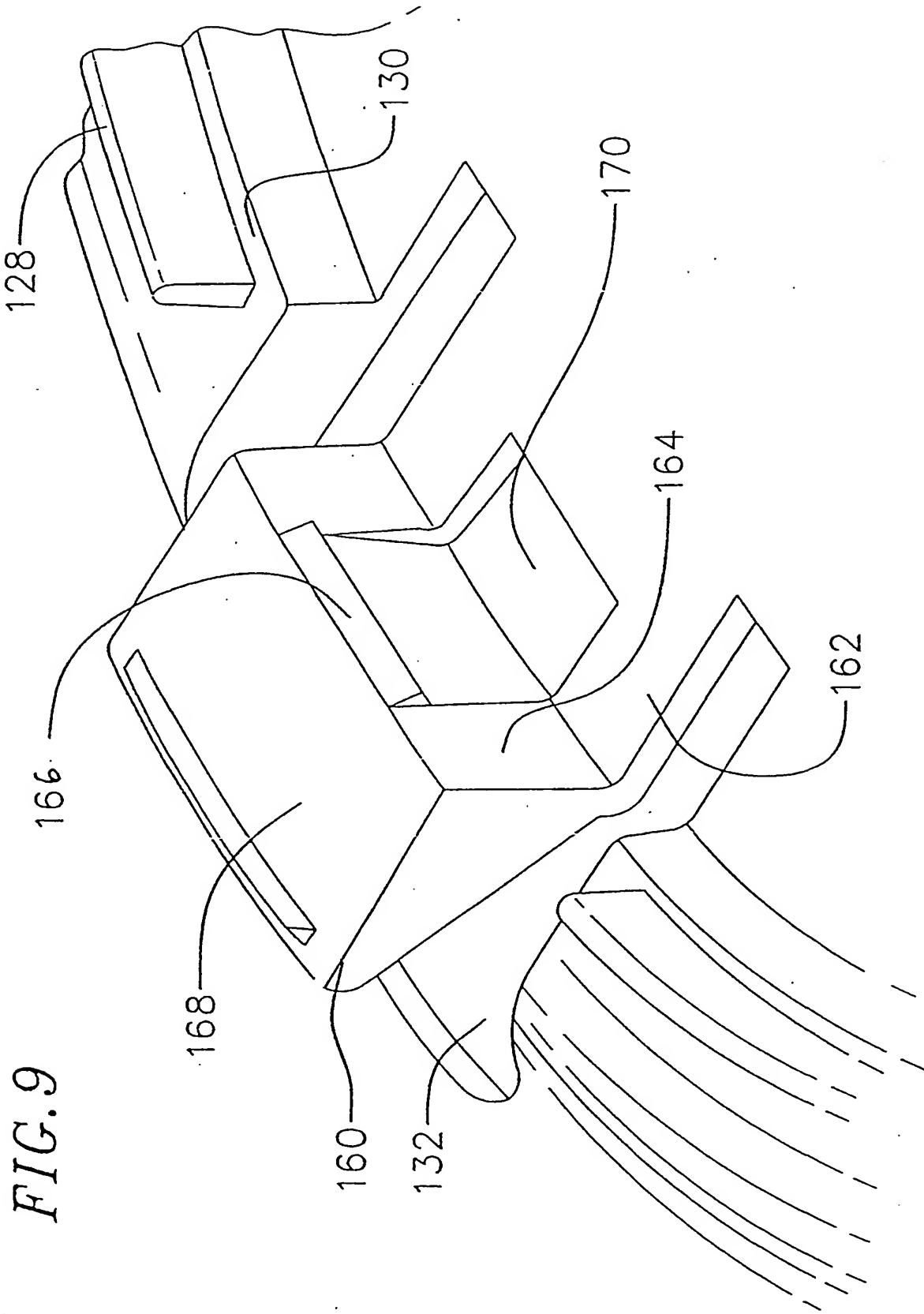


FIG. 9

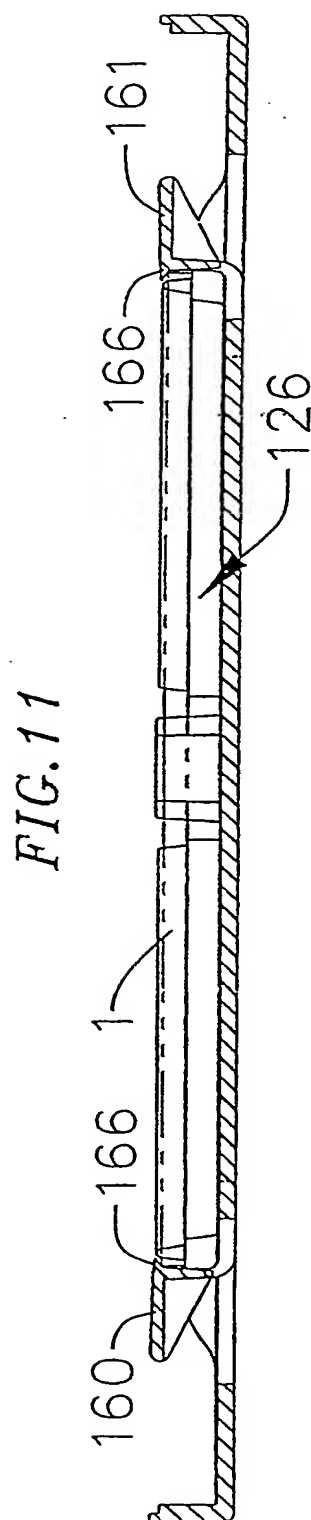
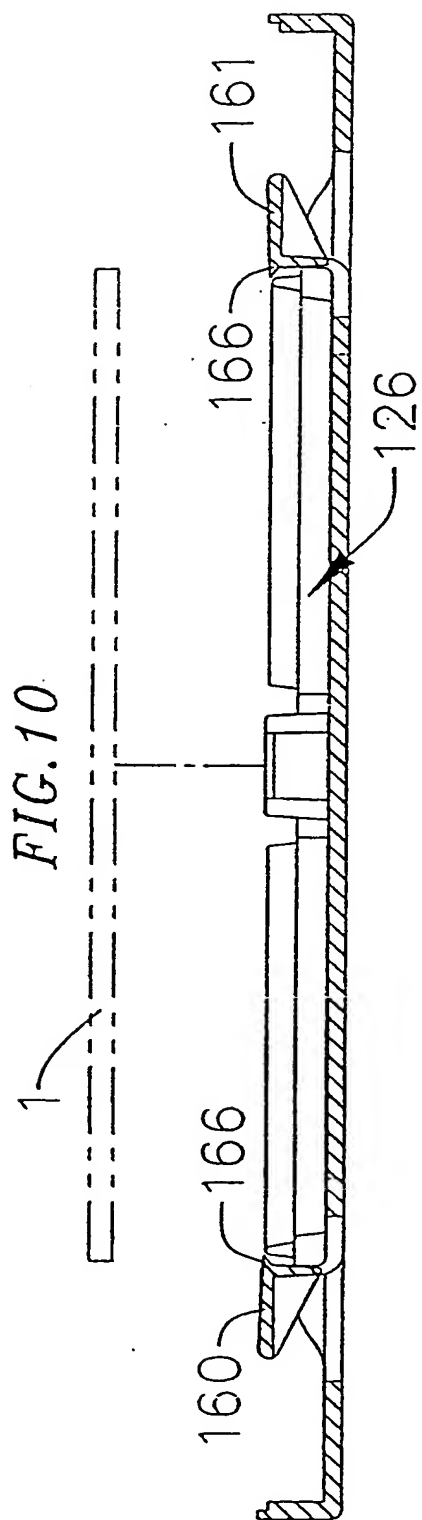
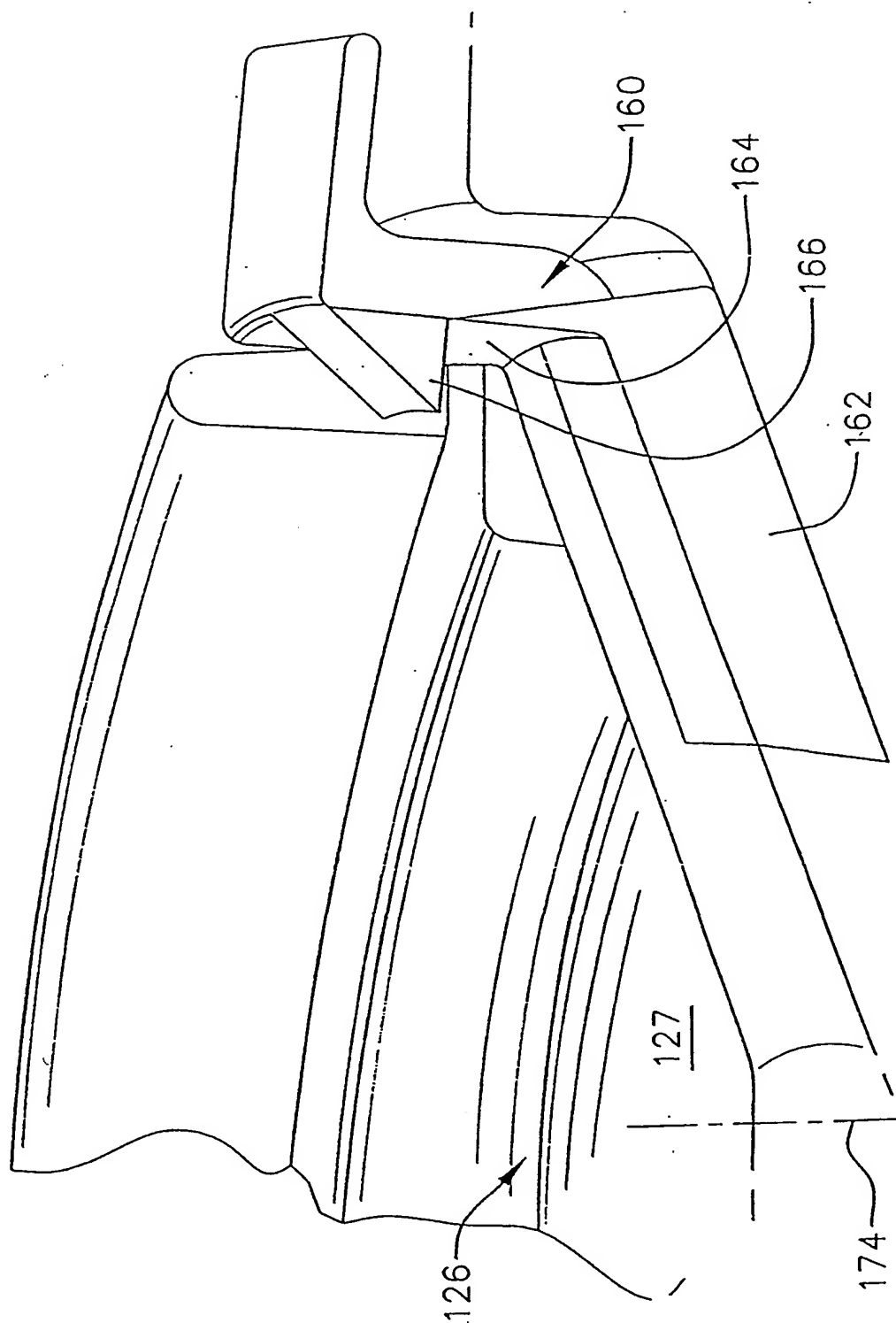
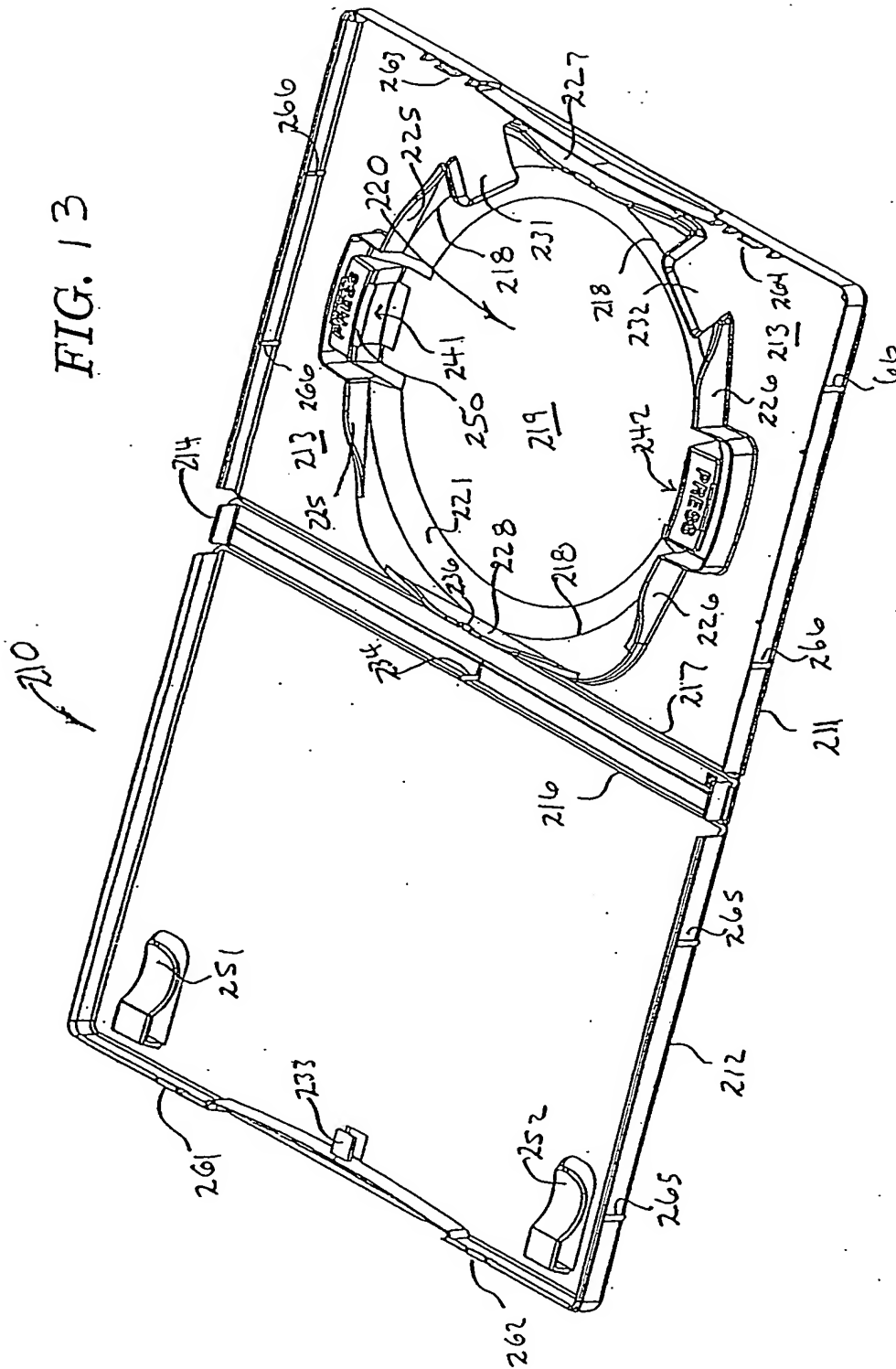


FIG. 12





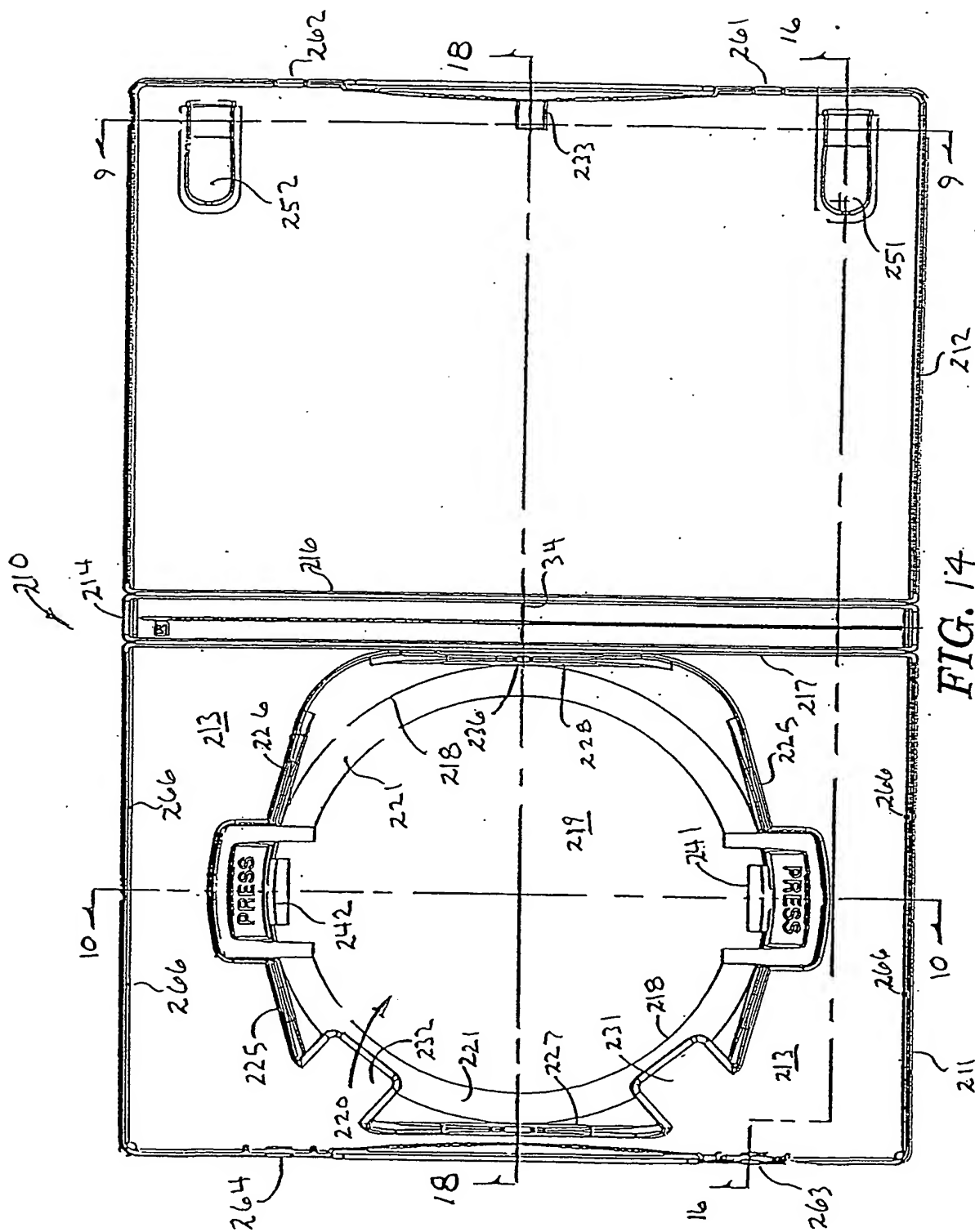


FIG. 14

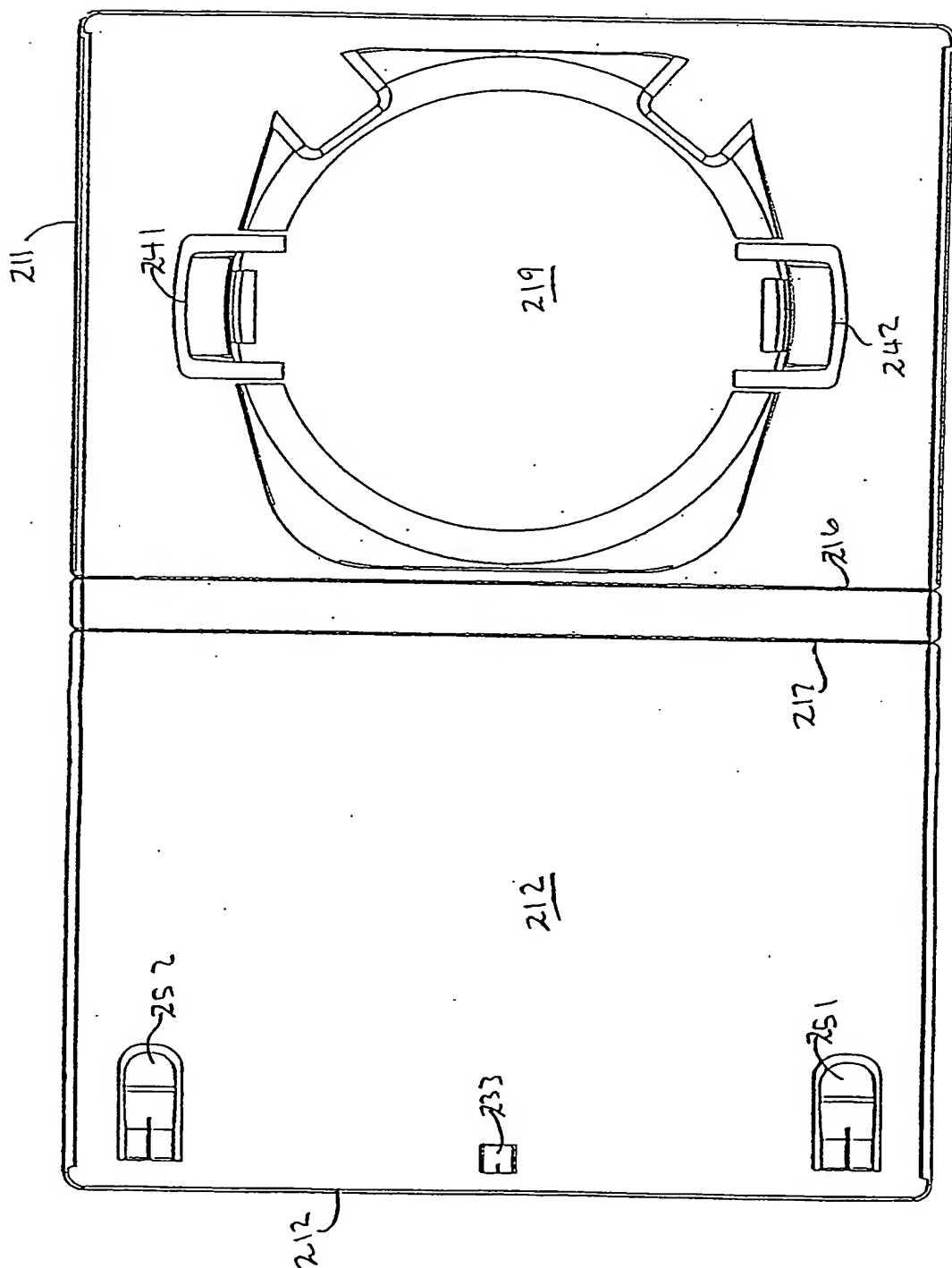
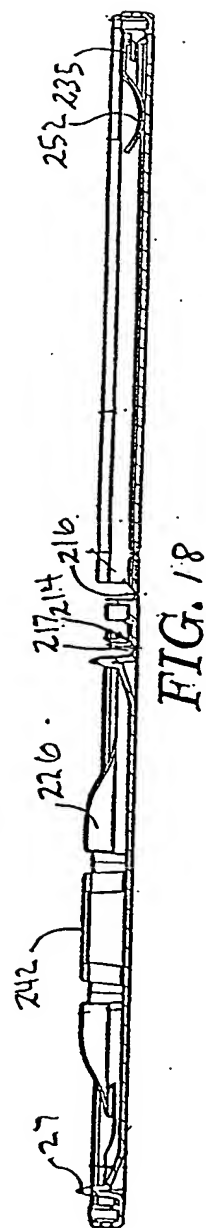
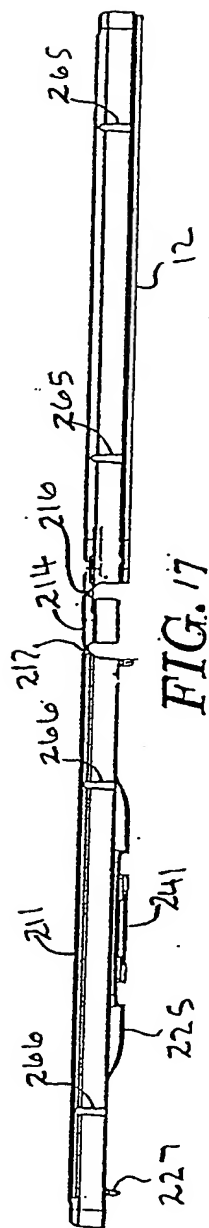
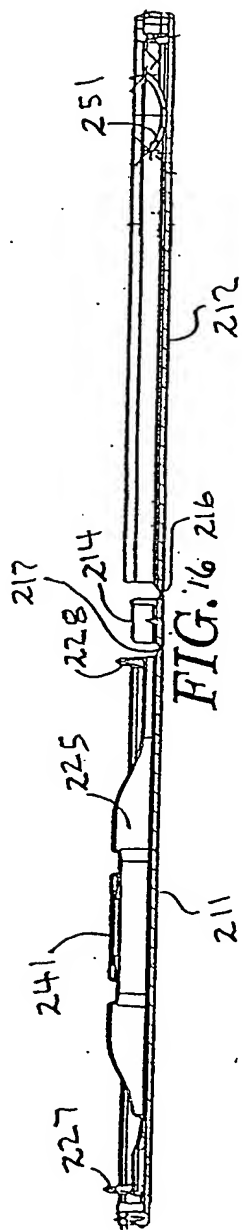
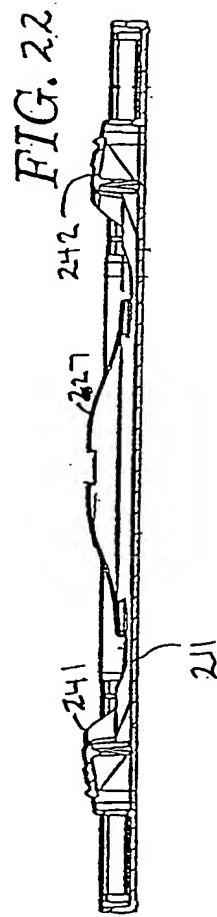
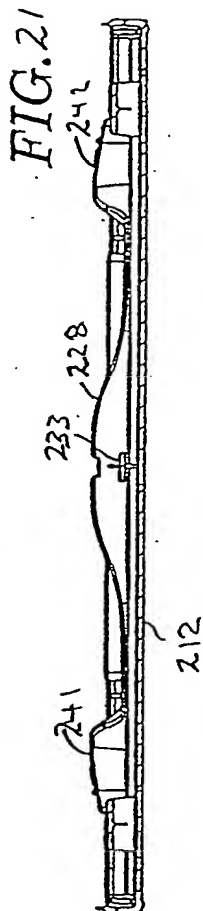
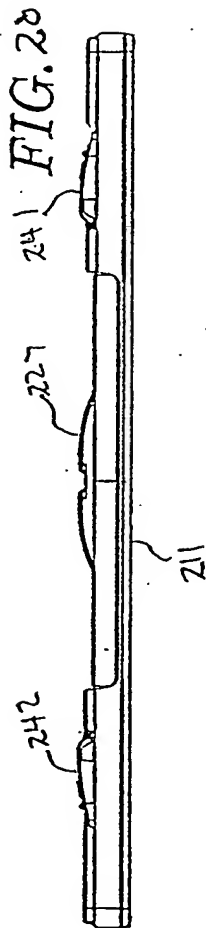
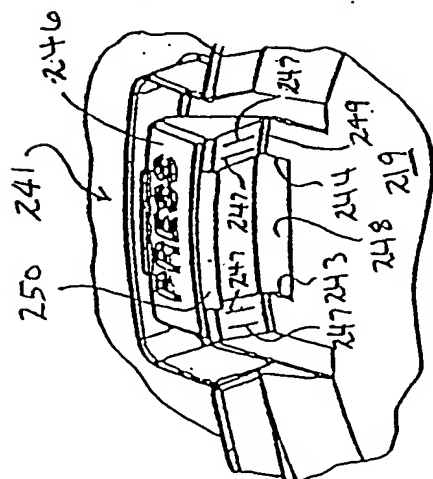
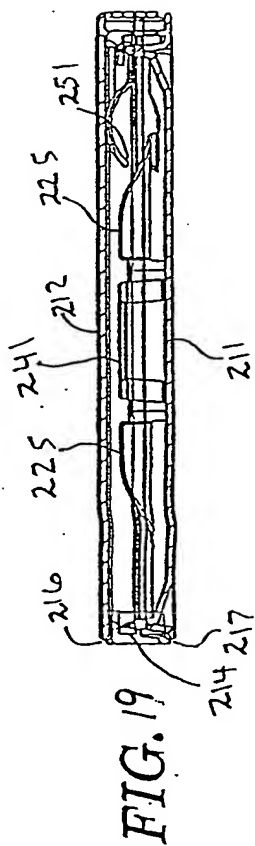


FIG. 15





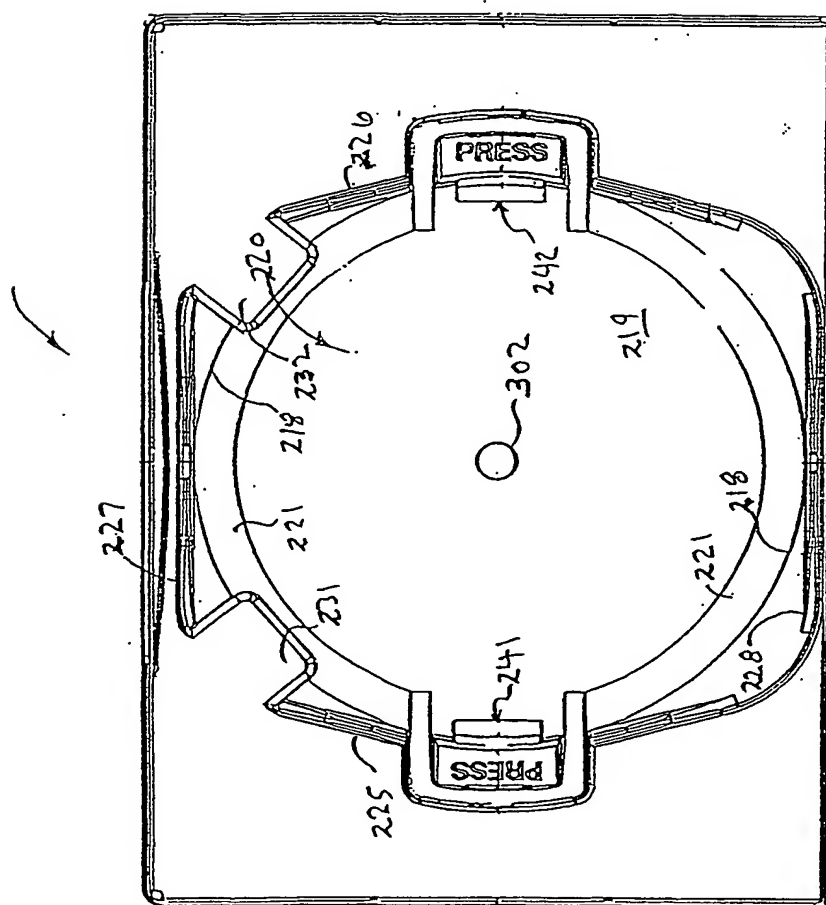


FIG. 24

FIG. 25

FIG. 26

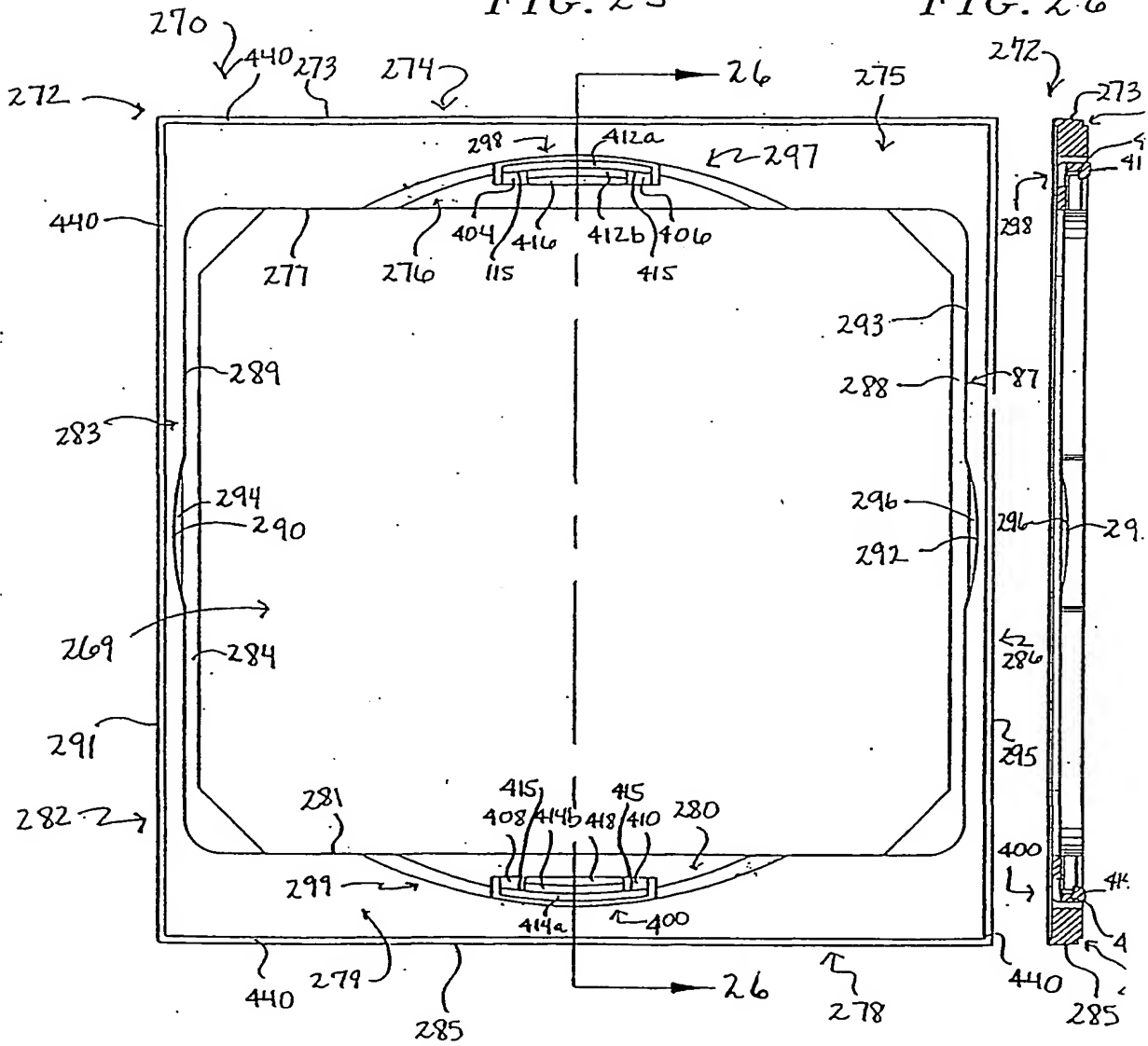
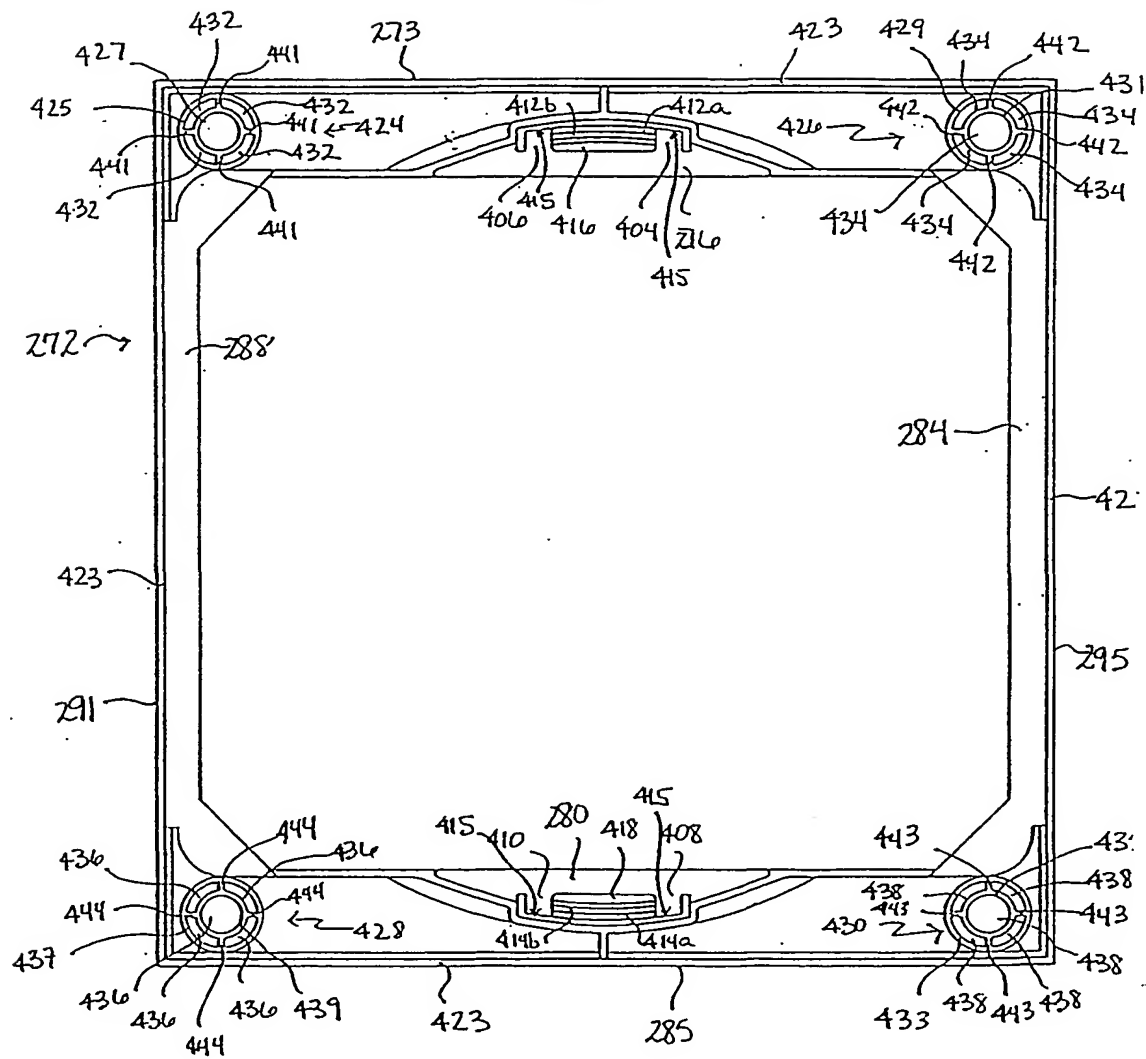


FIG. 27



INTERNATIONAL SEARCH REPORT

International application No.
PCT/US01/16337

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) :B65D 85/57; B65B 3/04

US CL :206/308.1, 310; 53/474

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 206/308.1, 309, 310; 53/474

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y, P	US 6,155,417 A (FLORES JR. et al) 05 December 2000, the entire document.	1-9,16,54-55,60-62,64-73,75-79
Y	US 5,938,020 A (LUCKOW) 17 August 1999, the entire document.	1-8,15,54-55,60-62,64-73,75-79
Y	US 5,829,582 A (IPPOLITO et al) 03 November 1998, Figure 1A and column 4, lines 36-49.	1-9,15-16,54-55,60-62,64-73,75-79

☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E" earlier document published on or after the international filing date	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"A" document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

13 JULY 2001

Date of mailing of the international search report

02 AUG 2001

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Sheila Venezy
Paralegal Specialist
Technology Center 3700

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US01/16337

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5,551,560 A (WEISBURN et al) 03 September 1996, the entire document.	28,30,32, 34,36
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Y		37-40
X	US 3,949,872 A (PAUDRAS) 13 April 1976, the entire document.	50
A, P	US 6,164,446 A (LAW) 26 December 2000.	
A	US 5,690,218 A (MCCAMY et al) 25 November 1997.	
A	US 5,574,716 A (UCHIDA) 12 November 1996.	
A	US 5,533,615 A (MCCAMY) 09 July 1996.	
A	US 4,771,890 A (HOFLAND et al) 20 September 1988.	

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